Historic, Archive Document

Do not assume content reflects current
scientific knowledge, policies, or practices.

aTD224.W2 W37

ashington Water Supply Outlook Report June 1, 2004

Conservation Service

United States Department of Agriculture

Water Supply Outlook Reports
and
Federal - State - Private
Cooperative Snow Surveys

For more water supply and resource management information, contact:

Local Natural Resources Conservation Service Field Office
or
Scott Pattee
Water Supply Specialist
Natural Resources Conservation Service
2021 E. College Way, Suite 214
Mt. Vernon, WA 98273-2873
(360) 428-7684

or

Public Affairs Specialist
Natural Resources Conservation Service
316 W. Boone Ave., Suite 450
Spokane, WA 99201-2348
(509) 323-2900

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require an alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue SW, Washington DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an Equal Opportunity provider and employer.

Washington
Water Supply Outlook

June 2004

General Outlook

Cooler and wetter weather for most of May has helped alleviate some water shortage concerns by reducing snowmelt rates and recharging streams and reservoirs. However it may be too little too late for most of Eastern Washington with summer streamflow projections as low as 14% of average on Salmon Creek near Conconully. Many streams experienced peak flows a month earlier than normal that were considerably below average. Most reservoirs in the state are near average levels and should help sustain water use requirements for the summer. National weather forecasters are indicating a return to above normal temperatures and below normal precipitation for the coming summer months.

Snowpack

The June 1 statewide SNOTEL readings dropped still further from last month to 39% of average. Of the remaining basins with snow left on the ground the Wenatchee Basin snow surveys reported the lowest readings at 18% of average. Readings in the Cowlitz River Basin reported the highest at 75% of average. Westside averages from SNOTEL, and June 1 snow surveys, included the North Puget Sound river basins with 45% of average, the Central Puget river basins with 41%, and the Lewis-Cowlitz basins with 69% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 36% and the Wenatchee area with 23%. Snowpack in the Spokane River Basin was at 39% of average. Maximum snow cover in Washington was at Paradise Park SNOTEL near Mt. Rainer, with water content of 55.2 inches. This site would normally have 61.6 inches of water content on June 1. Last year at this time Paradise Park had 51.6 inches of snow water. The highest average in the state was Lone Pine SNOTEL in the Lewis River Basin with 91% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	81	39
Newman Lake	0	0
Pend Oreille	60	58
Okanogan	52	48
Methow	26	23
Similkameen	n/a	n/a
Wenatchee	23	18
Chelan	35	28
Stemilt - Colockum	0	0
Upper Yakima	57	28
Lower Yakima	45	44
Ahtanum Creek	0	0
Walla Walla	0	0
Lower Snake	81	74
Cowlitz	99	75
Lewis	97	63
White	52	62
Green	0	0
Cedar	0	0
Snoqualmie	74	39
Skykomish	93	37
Skagit	36	34
Baker	68	55
Nooksack	0	0
Olympic Peninsula	45	19

Precipitation

During the month of May, the National Weather Service and Natural Resources Conservation Service climate stations reported above average precipitation totals throughout most Washington river basins. The highest percent of average in the state was at Wenatchee which reported 282% of average for a total of 1.44 inches. The average for this site is .51 inches for May. The wettest spot in the state was reported at Alpine Meadows SNOTEL in the Tolt River Basin with a May accumulation of 12.80 inches and a total of 132.6 inches for the water-year. Basin averages for the water year held steady or improved slightly across the state but remain near average.

RIVER BASIN	MAY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	173	94
Colville-Pend Oreille	129	86
Okanogan-Methow	98	91
Wenatchee-Chelan	133	90
Upper Yakima	133	94
Lower Yakima	115	88
Walla Walla	164	100
Lower Snake	199	102
Cowlitz-Lewis	134	84
White-Green-Puyallup	152	91
Central Puget Sound	166	97
North Puget Sound	109	100
Olympic Peninsula	120	105

Reservoir

Seasonal reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation and flood control. Reservoir storage in the Upper Yakima Basin was 688,000-acre feet, 95% of average and 229,200-acre feet, 112% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 67% of average for June 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 228,500 acre feet, 85% of average and 96% of capacity; Chelan Lake, 499,500-acre feet, 106% of average and 74% of capacity; and the Skagit River reservoirs at 118% of average and 89% of capacity.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	96	85
Colville-Pend Oreille	N/A	N/A
Okanogan-Methow	60	67
Wenatchee-Chelan	74	106
Upper Yakima	83	95
Lower Yakima	99	112
North Puget Sound	89	118

For more information contact your local Natural Resources Conservation Service office.

Streamflow

June forecasts for June-September flows vary from 132% of average for Mill Creek at Walla Walla to 14% of average for Salmon Creek near Conconully. June-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 80%; Green River, 88%; and Skagit River, 73%. Some Eastern Washington streams include the Yakima River near Parker, 48%: Wenatchee River at Plain, 40%; and Spokane River near Post Falls, 72%. Some higher than expected forecasts may indicate a runoff period that would have included actual precipitation induced peak flow during the month of May. Volumetric forecasts are developed using current, historic and average snowpack, precipitation, streamflow and climatic data collected and coordinated by organizations cooperating with NRCS.

Statewide May streamflows varied from below to much above average. Many of the reported streamflow measurements are from regulated reservoir systems, therefore streamflow readings may not be indicative of actual runoff. Many streams did however show increased runoff due to above average rainfall events last month. The Walla Walla River near Milton-Freewater, OR had the highest reported flows with 186% of average. The Yakima River at Kiona with 42% of average was the lowest in the state.

BASIN	PERCENT OF AVERAGE MOST PROBABLE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)
Spokane	72-94
Colville-Pend Oreille	39-85
Okanogan-Methow	14-30
Wenatchee-Chelan	36-91
Upper Yakima	39-51
Lower Yakima	48-80
Walla Walla	109-132
Lower Snake	65-73
Cowlitz-Lewis	76-87
White-Green-Puyallup	88
Central Puget Sound	79-88
North Puget Sound	73-84
Olympic Peninsula	72-83

STREAM	PERCENT OF AVERAGE MAY STREAMFLOWS
Pend Oreille Below Box Canyon	71
Kettle at Laurier	85
Columbia at Birchbank	82
Spokane at Long Lake	69
Similkameen at Nighthawk	98
Okanogan at Tonasket	85
Methow at Pateros	81
Chelan at Chelan	92
Wenatchee at Pashastin	92
Yakima at Cle Elum	73
Yakima at Parker	77
Naches at Naches	87
Grande Ronde at Troy	91
Snake below Lower Granite Dam	76
SF Walla Walla near Milton Freewater	186
Columbia River at The Dalles	78
Lewis at Ariel	61
Cowlitz below Mayfield Dam	82
Skagit at Concrete	90

For more information contact your local Natural Resources Conservation Service office.

BASIN SUMMARY OF SNOW COURSE DATA

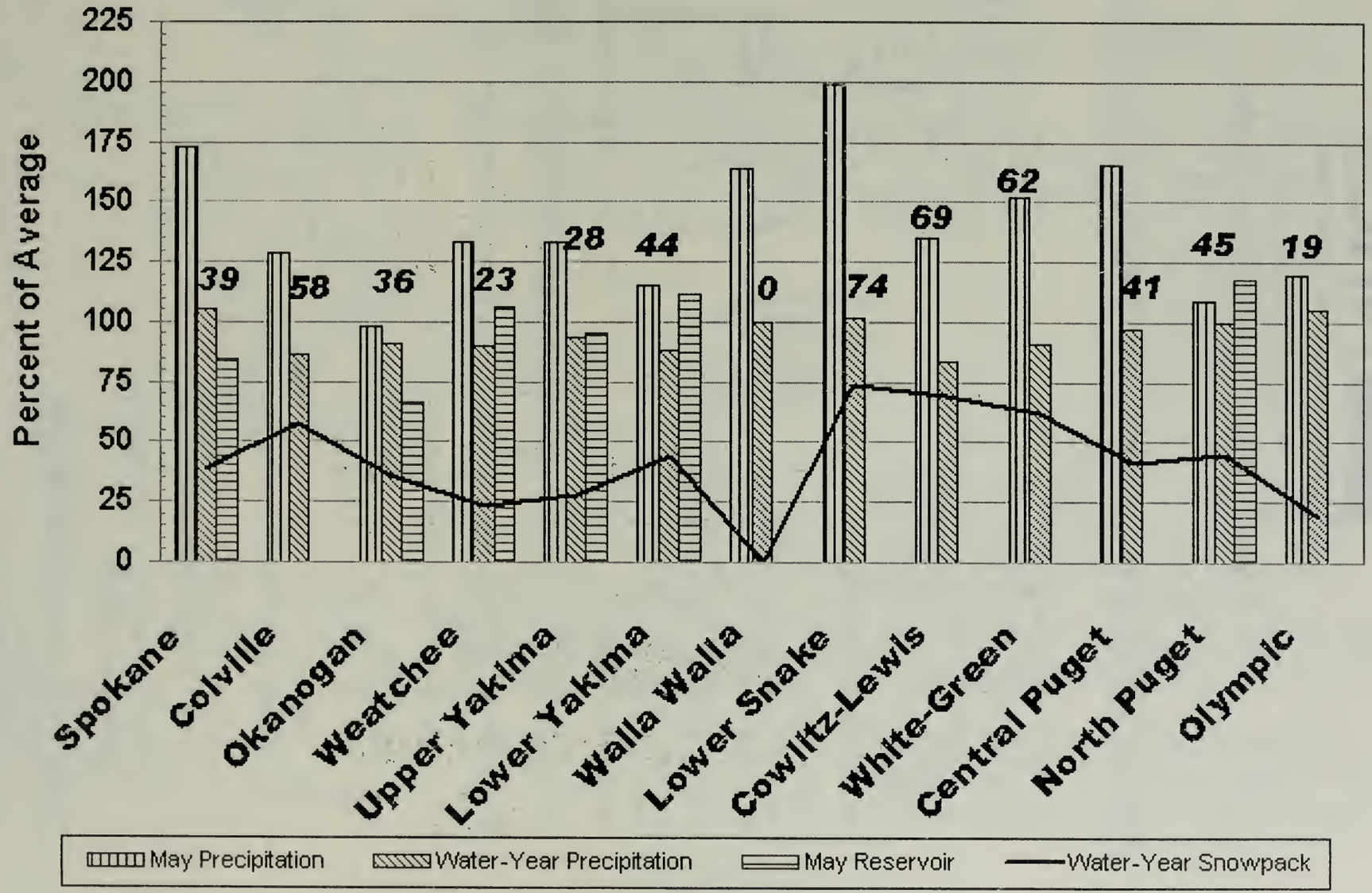
JUNE 2004

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
ALPINE MEADOWS SNTL	3500	6/01/04	32	15.0	12.8	31.4
BADGER PASS SNOTEL	6900	6/01/04	36	19.2	16.6	22.9
BARKER LAKES SNOTEL	8250	6/01/04	24	8.2	11.5	9.5
BASIN CREEK SNOTEL	7180	6/01/04	1	.3	.0	4.1
BASSOO PEAK	5150	5/27/04	0	.0	--	--
BEAVER CREEK TRAIL	2200	5/28/04	0	.0	.0	--
BEAVER PASS	3680	5/28/04	1	.2	5.5	--
BEAVER PASS SNOTEL	3680	6/01/04	22	3.8	9.5	--
BIG CREEK	6750	6/01/04	56	27.4	--	39.2
BLACK PINE SNOTEL	7100	6/01/04	0	.0	.0	1.9
BLACKWALL PEAK CAN.	6370	6/01/04	---	10.6	17.4	--
BLEWETT PASS#2SNOTEL	4270	6/01/04	0	.0	.0	.0
BROWN TOP AM	6000	5/27/04	51	28.6	44.2	--
BUMPING RIDGE SNOTEL	4600	6/01/04	0	.0	4.6	11.6
BUNCHGRASS MDWSNOTEL	5000	6/01/04	---	.0	14.4	9.7
BURNT MOUNTAIN PIL	4200	6/01/04	0	.0	.0	--
CHICKEN CREEK	4060	6/01/04	0	.0	.0	.0
COMBINATION SNOTEL	5600	6/01/04	0	.0	.0	.0
COPPER BOTTOM SNOTEL	5200	6/01/04	0	.0	.0	.0
CORRAL PASS SNOTEL	6000	6/01/04	---	20.3	25.2	23.1
COUGAR MTN. SNOTEL	3200	6/01/04	0	.0	.0	1.5
DALY CREEK SNOTEL	5780	6/01/04	0	.0	.0	.0
DEVILS PARK	5900	5/27/04	42	23.8	30.0	31.8
DISCOVERY BASIN	7050	5/25/04	2	.2	8.2	2.4
DOCK BUTTE AM	3800	6/01/04	---	21.0E	35.0	52.5
DUNGENESS SNOTEL	4100	6/01/04	0	.0	.0	--
EASY PASS AM	5200	6/01/04	---	55.0E	60.0	73.3
ELBOW LAKE SNOTEL	3200	6/01/04	0	.0	.0	19.8
EMERY CREEK SNOTEL	4350	6/01/04	0	.0	.0	.0
ENDERBY CAN.	5800	5/30/04	56	25.2	35.0	37.8
FISH LAKE SNOTEL	3370	6/01/04	0	.0	.0	7.5
FLATTOP MTN SNOTEL	6300	6/01/04	52	25.2	33.6	36.5
FREEZEOUT CK. TRAIL	3500	5/27/04	0	.0	.0	--
FROHNER MDWS SNOTEL	6480	6/01/04	0	.0	.0	.7
GRASS MOUNTAIN #2	2900	5/27/04	0	.0	.0	--
GRAVE CRK SNOTEL	4300	6/01/04	0	.0	.0	.0
GREEN LAKE SNOTEL	6000	6/01/04	0	.0	6.3	6.6
GROUSE CAMP SNOTEL	5380	6/01/04	0	.0	.0	.2
HAND CREEK SNOTEL	5030	6/01/04	0	.0	.0	.0
HARTS PASS SNOTEL	6500	6/01/04	15	7.2	27.0	29.2
HELL ROARING DIVIDE	5770	5/25/04	27	13.9	14.1	10.8
HERRIG JUNCTION	4850	6/01/04	0	.0	6.8	5.4
HIGH RIDGE SNOTEL	4900	6/01/04	---	.0	.0	1.2
HOODOO BASIN SNOTEL	6050	6/01/04	38	20.9	28.0	28.4
HUCKLEBERRY SNOTEL	2000	6/01/04	0	.0	.0	--
HUMBOLDT GLCH SNOTEL	4250	6/01/04	---	.0	.0	.0
JUNE LAKE SNOTEL	3200	6/01/04	0	.0	.0	10.1
KRAFT CREEK SNOTEL	4750	6/01/04	0	.0	.0	.0
LESTER CREEK	3100	5/27/04	0	.0	.0	--
LOLO PASS SNOTEL	5240	6/01/04	0	.0	2.9	4.9
LONE PINE SNOTEL	3800	6/01/04	---	16.8	13.5	18.4
LOOKOUT SNOTEL	5140	6/01/04	0	.0	.0	8.0
LOST HORSE SNOTEL	5000	6/01/04	0	.0	.0	.2
LOST LAKE SNOTEL	6110	6/01/04	---	25.5	31.0	41.5
LUBRECHT SNOTEL	4680	6/01/04	0	.0	.0	.0
LYMAN LAKE SNOTEL	5900	6/01/04	---	12.1	49.1	50.8
LYNN LAKE	4000	5/27/04	0	.0	.0	--
MEADOWS CABIN	1900	5/28/04	0	.0	.0	--
MEADOWS PASS SNOTEL	3240	6/01/04	0	.0	.0	.9
M F NOOKSACK SNOTEL	4980	6/01/04	78	49.5	42.0	--
MICA CREEK SNOTEL	4750	6/01/04	0	.0	.0	.0
MINERS RIDGE SNOTEL	6200	6/01/04	---	19.0	31.2	42.5
MISSION CREEK CAN.	5840	6/01/04	---	11.5	12.1	13.0
MORSE LAKE SNOTEL	5400	6/01/04	---	15.0	43.0	33.6
MOSES MTN SNOTEL	4800	6/01/04	0	.0	.0	.1
MOSQUITO RDG SNOTEL	5200	6/01/04	---	3.2	4.3	11.0
MOUNT BLUM AM	5800	6/01/04	---	31.0E	52.0	68.1
MOUNT CRAG SNOTEL	4050	6/01/04	0	1.5	4.0	7.8
MOWICH SNOTEL	3150	6/01/04	0	.0	.0	--
MOUNT GARDNER SNOTEL	2860	6/01/04	---	.0	.0	.0
N.F. ELK CR SNOTEL	6250	6/01/04	0	.0	.0	.6
NEVADA RIDGE SNOTEL	7020	6/01/04	0	.0	2.3	3.4
NEW HOZOMEEN LAKE	2800	5/27/04	0	.0	.0	--
NEZ PERCE CMP SNOTEL	5650	6/01/04	0	.0	.0	.3
NOISY BASIN SNOTEL	6040	6/01/04	51	22.7	22.9	30.1
NORTH FORK JOCKO	6330	6/01/04	20	8.6	18.1	--
OLALLIE MDWS SNOTEL	3960	6/01/04	23	11.7E	18.9	31.8
OPHIR PARK	7150	6/01/04	0	.0	8.4	--
PARADISE PARK SNOTEL	5500	6/01/04	---	55.2	51.6	61.6
PARK CK RIDGE SNOTEL	4600	6/01/04	0	.0	3.9	11.5
PETERSON MDW SNOTEL	7200	6/01/04	0	.0	6.8	2.7
PIGTAIL PEAK SNOTEL	5900	6/01/04	60	31.9	42.0	39.9
PIKE CREEK SNOTEL	5930	6/01/04	0	.0	.0	7.3
POPE RIDGE SNOTEL	3540	6/01/04	0	.0	.0	.0
POTATO HILL SNOTEL	4500	6/01/04	---	.0	.6	2.7
QUARTZ PEAK SNOTEL	4700	6/01/04	0	.0	.0	.0
RAINY PASS SNOTEL	4780	6/01/04	13	5.0	19.6	24.3
REX RIVER SNOTEL	1900	6/01/04	0	.0	.0	6.1
ROCKER PEAK SNOTEL	8000	6/01/04	31	11.3	11.4	11.7
SADDLE MTN SNOTEL	7900	6/01/04	28	10.1	15.9	16.3
SALMON MDWS SNOTEL	4500	6/01/04	0	.0	.0	.0
SASSE RIDGE SNOTEL	4200	6/01/04	0	.0	.0	5.9
SAVAGE PASS SNOTEL	6170	6/01/04	16	.3	13.1	10.4
SAWMILL RIDGE	4700	5/27/04	0	.0	.0	--
SCHREIBERS MDW AM	3400	6/01/04	---	20.0E	33.0	41.4
SENTINEL BT SNOTEL	4920	6/01/04	0	.0	--	--
SHEEP CANYON SNOTEL	4050	6/01/04	---	6.1	.0	13.7
SHERWIN SNOTEL	3200	6/01/04	---	.0	.0	.0
SKALKAHO SNOTEL	7260	6/01/04	26	10.0	17.9	14.6
SKOOKUM CREEK SNOTEL	3920	6/01/04	0	.0	.0	1.5
SOURDOUGH GULCH SNTL	4000	6/01/04	0	.0	.0	--
SPENCER MDW SNOTEL	3400	6/01/04	---	.0	.0	3.0
SPIRIT LAKE SNOTEL	3100	6/01/04	---	.0	.0	--
SPRUCE SPRINGS SNTL	5700	6/01/04	0	.0	.0	--
STAHL PEAK SNOTEL	6030	6/01/04	42	19.3	28.7	28.0
STAMPEDE PASS SNOTEL	3860	6/01/04	5	6.0	12.2	18.6
STEVENS PASS SNOTEL	4070	6/01/04	0	.0	3.3	9.0
STRYKER BASIN	6180	6/01/04	23	11.1	21.8	19.4
SUNSET SNOTEL	5540	6/01/04	---	.0	.0	13.5
SURPRISE LKS SNOTEL	4250	6/01/04	---	15.1	19.4	19.0
SWAMP CREEK SNOTEL	4000	6/01/04	0	.0	.0	--
THUNDER BASIN SNOTEL	4200	6/01/04	---	.0	7.2	9.3
THUNDER BASIN	4200	5/28/04	0	.0	9.0	10.0
TINKHAM CREEK SNOTEL	3000	6/01/04	---	.0	.0	2.9
TOUCHET SNOTEL	5530	6/01/04	0	.0	.0	2.5
TROUGH #2 SNOTEL	5310	6/01/04	0	.0	.0	.0
TV MOUNTAIN	6800	6/01/04	0	.0	.0	--
TWELVEMILE SNOTEL	5600	6/01/04	0	.0	.0	.4
TWIN CAMP	4100	5/27/04	0	.0	--	--
TWIN LAKES SNOTEL	6400	6/01/04	15	7.3	23.3	22.3
UPPER WHEELER SNOTEL	4400	6/01/04	0	.0	.0	.0
WARM SPRINGS SNOTEL	7800	6/01/04	42	17.2	22.5	17.0
WATSON LAKES AM	4500	6/01/04	---	33.0E	55.0	57.4
WATERHOLE SNOTEL	5000	6/01/04	14	10.1	22.0	--
WELLS CREEK SNOTEL	4200	6/01/04	0	.0	4.1	--
WHITE PASS ES SNOTEL	4500	6/01/04	0	.0	.0	5.6

NRCS Natural Resources Conservation Service

June 1, 2004 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1, 2003 - Current Date)



USDA NRCS
Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Program Contacts

RL "Gus" Hughbanks
State Conservationist
Spokane State Office
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2961
fax: 509-323-2979
gus.hughbanks@wa.usda.gov

Jon Lea
Assistant DCO Supervisor
Oregon Data Collection Office
101 SW Main St, Suite 1300
Portland, OR 97204
Phone: 503-414-3267
Fax: 503-414-3277
jon.lea@or.usda.gov

Scott Pattee
Water Supply Specialist
Washington Snow Survey Office
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873
phone: 360-428-7684
fax: 360-424-6172
scott.pattee@wa.usda.gov

Chris Pacheco
Resource Conservationist
National Water and Climate Center
101 SW Main St., Suite 1600
Portland, OR 97204-3224
phone: 503-414-3056
fax: 503-414-3101
cpacheco@wcc.nrcs.usda.gov

Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.wa.nrcs.usda.gov/snow/snow

Oregon:
http://www.or.nrcs.usda.gov/snow/snow

Idaho:
http://www.id.nrcs.usda.gov/snow

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

NWCC Anonymous FTP Server:
ftp.wcc.nrcs.usda.gov

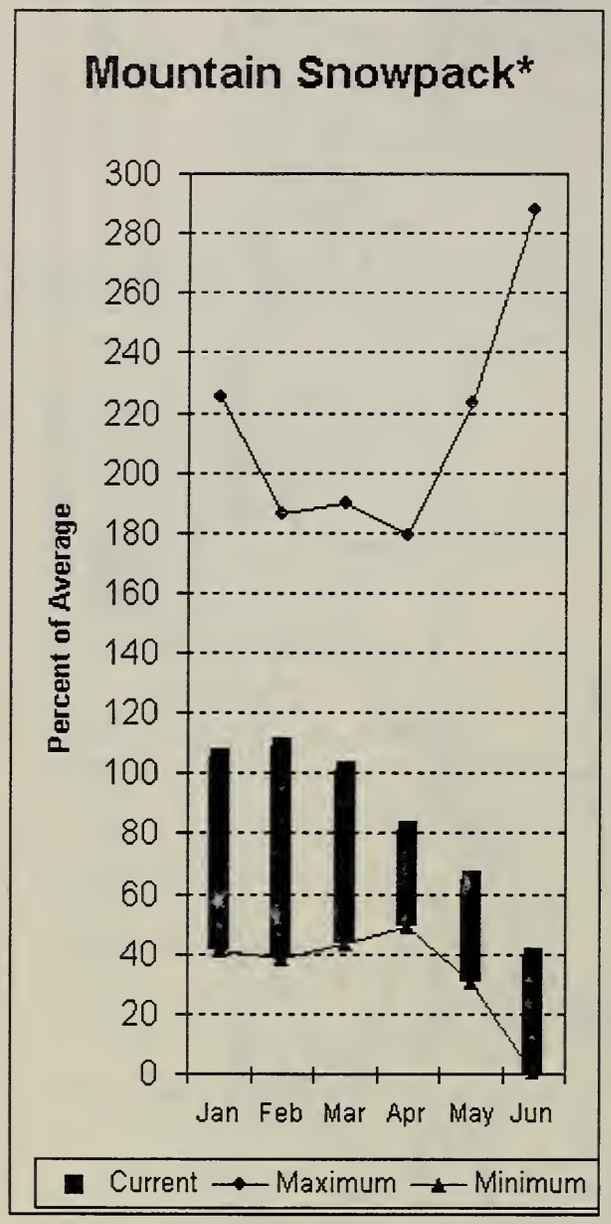
USDA-NRCS Agency Homepages

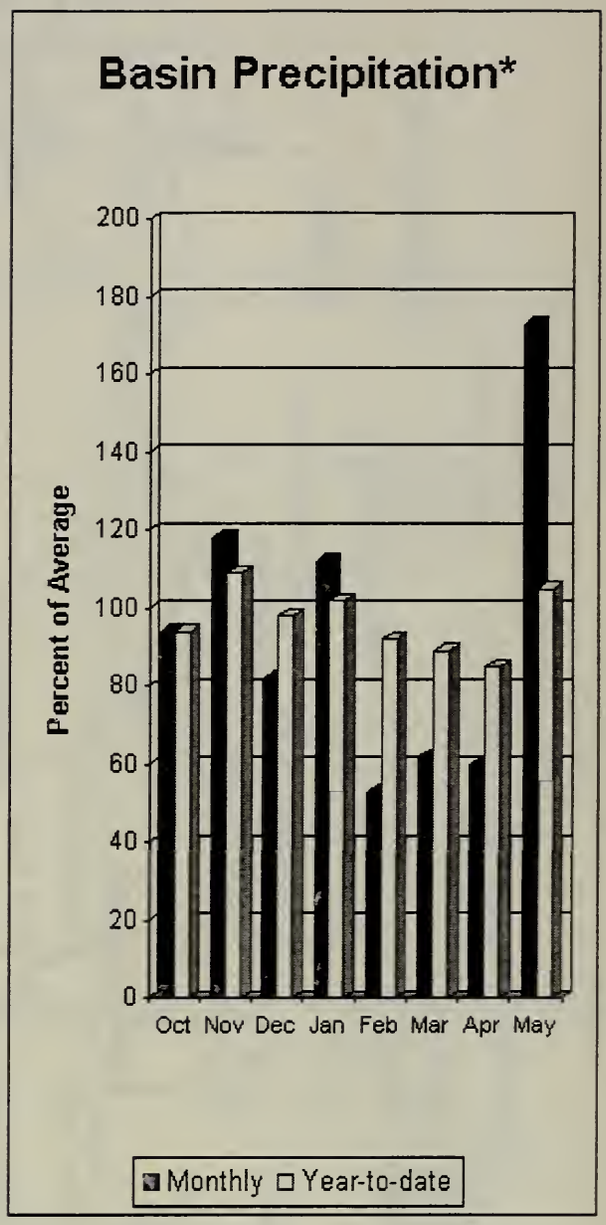
Washington:
http://www.wa.nrcs.usda.gov/nrcs

NRCS National:
http://www.nrcs.usda.gov


Hozomeen Camp
Heather Meadows
MF Nooksack
Wells Creek
Beaver Pass
Sentinel Butte
Bellingham
Elbow Lake
Harts Pass
Bunchgrass Meadows
Salmon Meadows
Swamp Creek
Rainy Pass
Thunder Basin
Colville
Park Creek Ridge
Moses Mountain
Okanogan
Port Angeles
Lyman Lake
Miners Ridge
Waterhole
Pope Ridge
Dungeness
Quartz Peak
Alpine Meadows
Mt. Crag
Stevens Pass
Skookum Creek
Spokane
Fish Lake
Olallie Meadows
Wenatchee
Sasse
Blewett Pass
Mt. Gardner
Tinkham
Upper Wheeler
Rex River
Stampede Pass
Trough
Cougar Mtn
Meadows Pass
Grouse Camp
Huckleberry Creek
Olympia
Burnt Mtn
Corral Pass
Mowich
Morse Lake
Paradise Park
Bumping Ridge
Pullman
Pigtail Peak
White Pass
Yakima
Green Lake
Potato Hill
Spirit Lake
Lost Horse
Sourdough Gulch
Lone Pine
Sheep Canyon
Spencer Meadow
Touchet
Spruce Springs
Swift Creek
Surprise Lakes
June Lake
Walla Walla
Vancouver
LEGEND:
Basin Boundary
County Line
SNOTEL Data Site
Cooperative Data Site
City
NRCS Natural Resources Conservation Service
http://www.wa.nrcs.usda.gov/snow

Spokane River Basin





*Based on selected stations

The June 1 forecasts for summer runoff within the Spokane River Basin are 72% of average near Post Falls and 78% at Long Lake. The Chamokane River near Long Lake is forecasted to recieve 94% of the average 3,500 acre-feet base flows for the July-August period. The forecast is based on a basin snowpack that is 39% of average and precipitation that is 94% of average for the water year. Precipitation for May was much below above at 173% of average. Streamflow on the Spokane River at Long Lake was 69% of average for May. June 1 storage in Coeur d'Alene Lake was 228,500-acre feet, 85% of average and 96% of capacity. Snowpack at Quartz Peak SNOTEL site melted out about the 1st of May, almost a month early. Temperatures in the Spokane basin were near average for the past 28 days and 1 degree above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

SPOKANE RIVER BASIN
Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
SPOKANE near Post Falls (2)	JUN-SEP	345	475	560	72	645	775	775
	JUN-JUL	270	390	475	70	560	680	675
SPOKANE at Long Lake (2)	JUN-JUL	400	535	625	74	715	850	840
	JUN-SEP	585	730	825	78	925	1065	1060
CHAMOKANE CREEK near Long Lake	JUL-AUG	2.90	3.20	3.30	94	3.40	3.70	3.50

SPOKANE RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
COEUR D'ALENE	238.5	228.5	216.5	270.4

SPOKANE RIVER BASIN
Watershed Snowpack Analysis - June 1, 2004

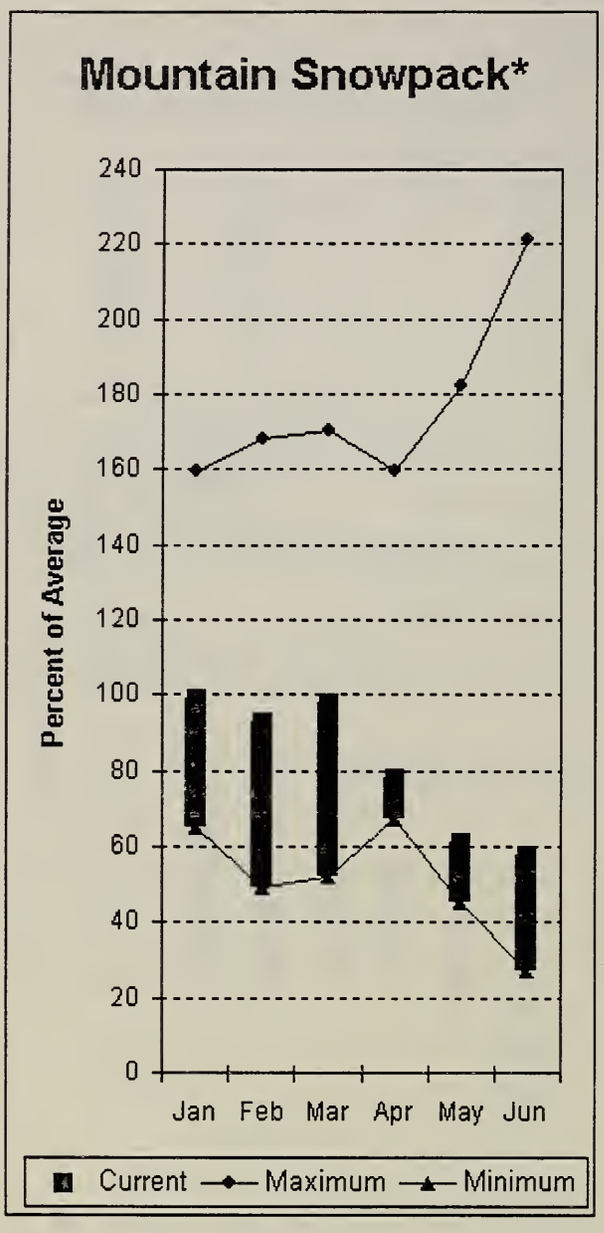
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
SPOKANE RIVER	8	81	39
NEWMAN LAKE	1	0	0

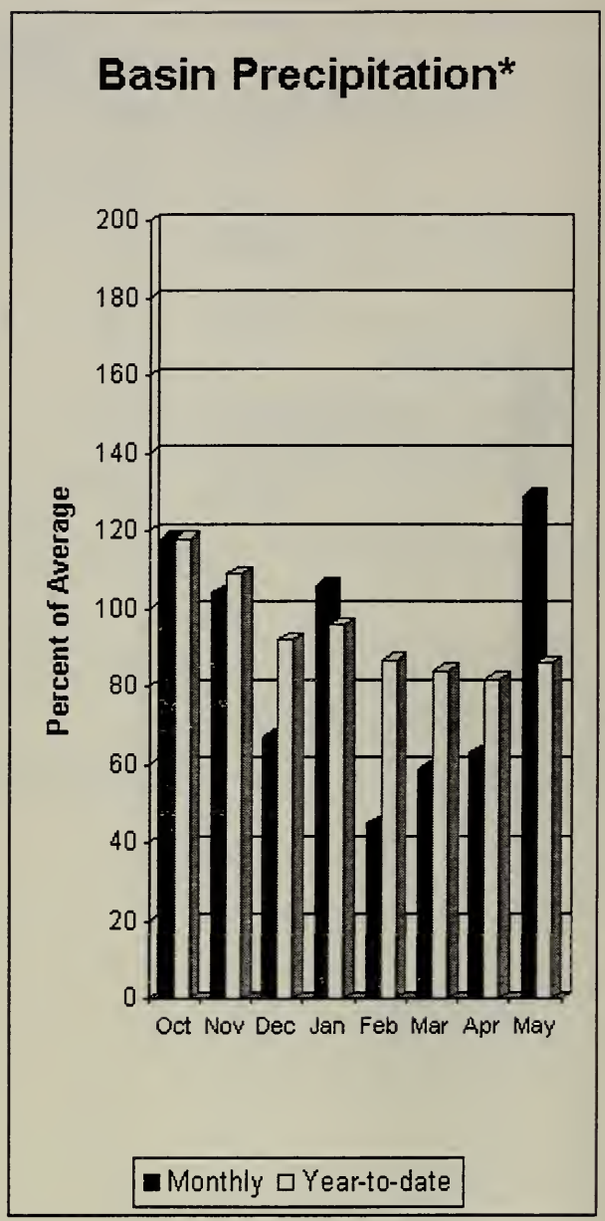
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Colville - Pend Oreille River Basins





*Based on selected stations

The June – September average forecast for the Kettle River streamflow is 42%, Colville at Kettle Falls is 46%, and Priest River near the Town of Priest River is 41%. May streamflow was 71% of average on the Pend Oreille River, 82% on the Columbia at the International Boundary and 85% on the Kettle River. June 1 snow cover was 58% of average in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site melted out before the 1st of June, almost three weeks early. Precipitation during May was 129% of average, bringing the year-to-date precipitation to 86% of average. Average temperatures were near normal for the past 28 days and 1 degree above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
PEND OREILLE Lake Inflow (2)	JUN-JUL	1766	2036	2220	36	2730	3480	6120
	JUN-SEP	2319	2641	2860	39	3420	4250	7280
PRIEST near Priest River (1,2)	JUN-JUL	88	102	112	39	137	192	290
	JUN-SEP	111	128	140	41	170	230	345
PEND OREILLE bl Box Canyon (2)	JUN-JUL	1651	1996	2230	36	2880	3840	6190
	JUN-SEP	2243	2616	2870	39	3520	4480	7370
COLVILLE at Kettle Falls	JUN-SEP	14.1	18.8	22	46	29	39	48
	JUN-JUL	8.7	12.5	15.1	43	21	30	35
KETTLE near Laurier	JUN-SEP	283	332	365	42	445	565	880
	JUN-JUL	274	316	345	44	410	505	780
COLUMBIA at Birchbank (1,2)	JUN-JUL	15379	17525	18500	84	19475	21620	22000
	JUN-SEP	22124	24858	26100	85	27340	30080	30600
COLUMBIA at Grand Coulee Dm (1,2)	JUN-SEP	28125	31959	33700	84	35440	39270	40300
	JUN-JUL	20625	23771	25200	83	26630	29780	30200

COLVILLE - PEND OREILLE RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROOSEVELT		NO REPORT		
BANKS		NO REPORT		

COLVILLE - PEND OREILLE RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

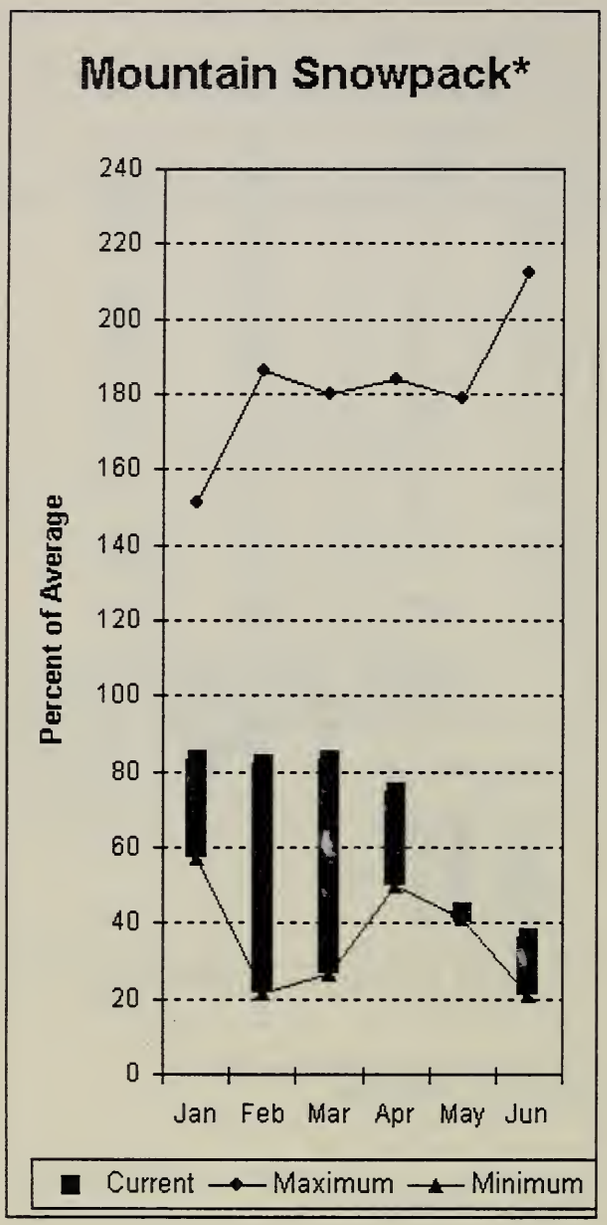
Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
COLVILLE RIVER	0	0	0
PEND OREILLE RIVER	8	10	6
KETTLE RIVER	0	0	0

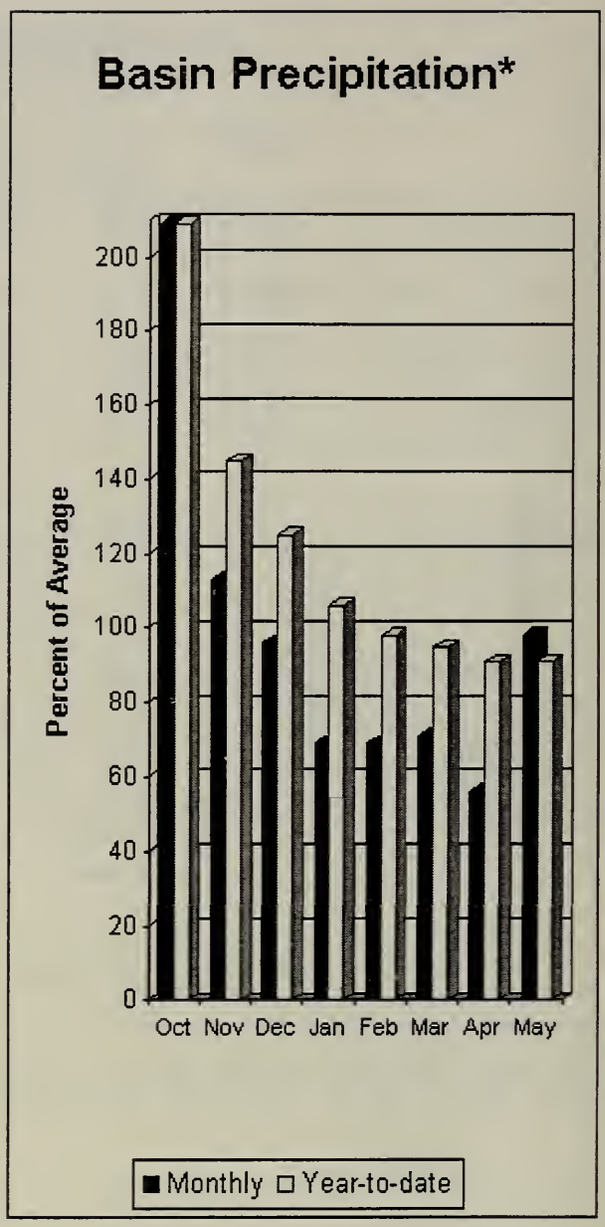
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Okanogan - Methow River Basins





*Based on selected stations

Summer runoff average forecast for the Okanogan River is 28%, Similkameen River is 29%, Methow River is 30% and Salmon Creek is 14%. June 1 snow cover on the Okanogan was 48% of average, Omak Creek was melted out and the Methow was 23%. May precipitation in the Okanogan-Methow was 98% of average, with precipitation for the water year at 91% of average. May streamflow for the Methow River was 81% of average, 85% for the Okanogan River and 98% for the Similkameen. Harts Pass SNOTEL had 7.2 inches of snow water left on the snow pillow. Average for this site is 29.2 inches on June 1. Combined storage in the Conconully Reservoirs was 14,100-acre feet, which is 60% of capacity and 67% of the June 1 average. Temperatures were 2 degrees below average for the past 28 days and 1 degree above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
SIMILKAMEEN near Nighthawk (1)	JUN-JUL	161	196	220	30	300	470	735
	JUN-SEP	188	222	245	29	325	500	835
OKANOGAN near Tonasket (1)	JUN-JUL	171	212	240	28	340	555	860
	JUN-SEP	214	259	290	28	400	645	1050
SALMON CREEK near Conconully	JUN-JUL	0.95	1.04	1.10	12	1.59	2.32	9.20
	JUN-SEP	1.2	1.3	1.4	14	1.9	2.7	10.2
BEAVER CREEK below SF near Twisp	JUN-SEP	0.58	0.89	1.10	18	2.30	4.10	6.30
	JUN-JUL	0.36	0.62	0.80	15	2.00	3.70	5.30
METHOW RIVER near Pateros	JUN-SEP	130	151	165	30	215	285	560
	JUN-JUL	105	121	132	27	172	232	490

OKANOGAN - METHOW RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
SALMON LAKE	10.5	5.8	4.5	9.7
CONCONULLY RESERVOIR	13.0	8.3	8.2	11.4

OKANOGAN - METHOW RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

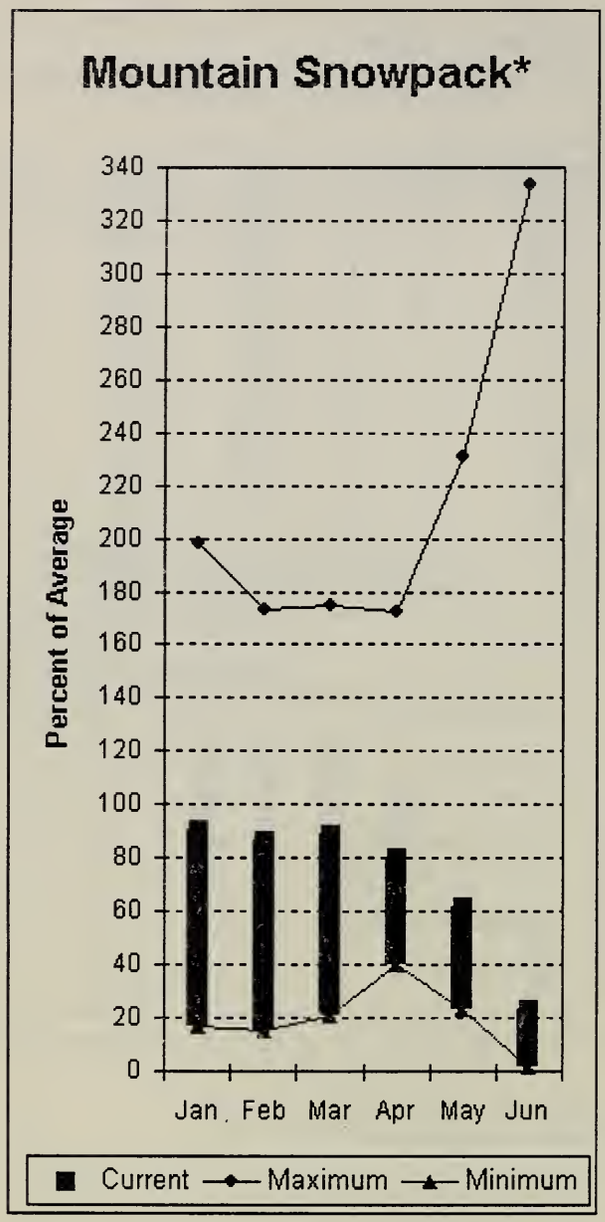
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
OKANOGAN RIVER	3	52	48
OMAK CREEK	1	0	0
SANPOIL RIVER	0	0	0
SIMILKAMEEN RIVER	0	0	0
TOATS COULEE CREEK	0	0	0
CONCONULLY LAKE	1	0	0
METHOW RIVER	3	26	23

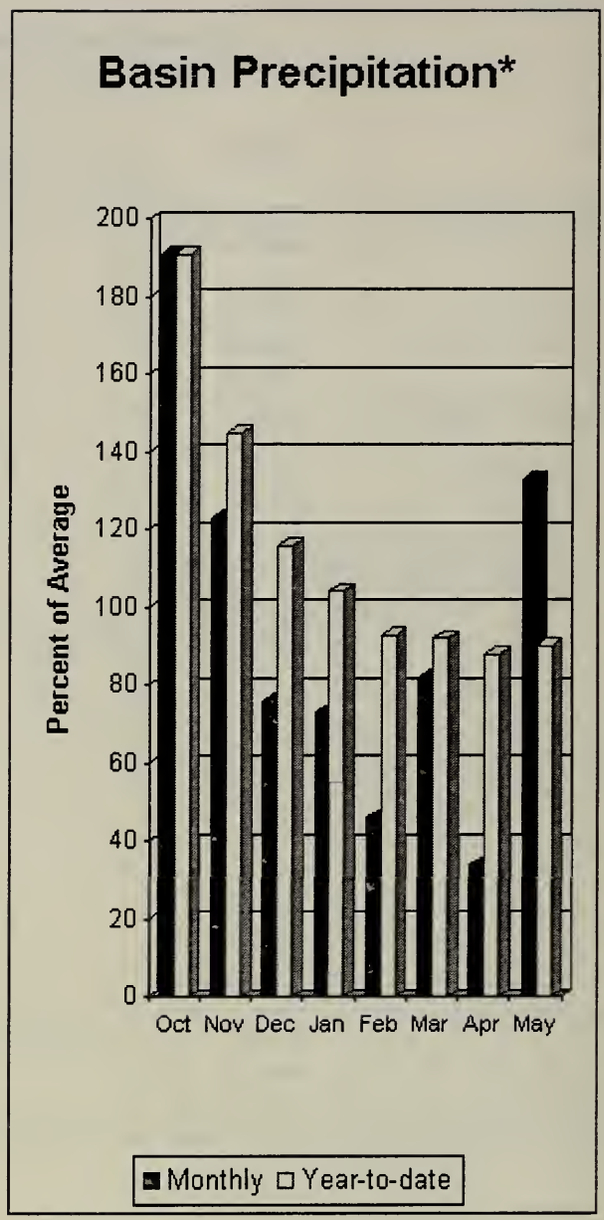
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Wenatchee - Chelan River Basins





*Based on selected stations

Precipitation during May was 133% of average in the basin and 90% for the year-to-date. Runoff for Entiat River is forecast to be 36% of average for the summer. The June-September average forecast for Chelan River is 50%, Wenatchee River at Plain is 40%, Stehekin is 58%, Icicle Creek is 61% and Stemilt Creek 91% for the May-September period. May average streamflows on the Chelan River were 92% and on the Wenatchee River 92%. June 1 snowpack in the Wenatchee River Basin was 18% of average; the Chelan, 28%; the Entiat River; Stemilt Creek, and Colockum Creek had all melted out prior to June 1. Reservoir storage in Lake Chelan was 499,500-acre feet, 106% of June 1 average and 74% of capacity. Miners Ridge SNOTEL had the most snow water with 19 inches of water. This site would normally have 42.5 inches on June 1. Temperatures were 1-2 degrees below normal for the past 28 days and near normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
CHELAN RIVER near Chelan	JUN-SEP	285	333	365	50	430	525	730
	JUN-JUL	215	254	280	48	335	420	590
STEHEKIN near STEHEKIN	JUN-SEP	246	284	310	58	355	420	535
	JUN-JUL	185	215	235	57	270	325	410
ENTIAT RIVER nr Ardenvoir	JUN-SEP	47	51	53	36	59	69	149
	JUN-JUL	37	39	41	32	47	54	127
WENATCHEE at Plain	JUN-JUL	161	184	200	35	245	310	575
	JUN-SEP	225	258	280	40	335	420	695
STEMILT CK nr Wenatchee (miner's in)	MAY-SEP	93	113	126	91	139	159	138
ICICLE CREEK near Leavenworth	JUN-SEP	97	111	121	61	136	161	199
	JUN-JUL	78	91	100	58	115	140	172
COLUMBIA R. bl Rock Island Dam (2)	JUN-SEP	31864	35220	37500	86	39780	43140	43500
	JUN-JUL	22764	26120	28400	86	30680	34040	33000

WENATCHEE - CHELAN RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
CHELAN LAKE	676.1	499.5	452.6	473.0

WENATCHEE - CHELAN RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

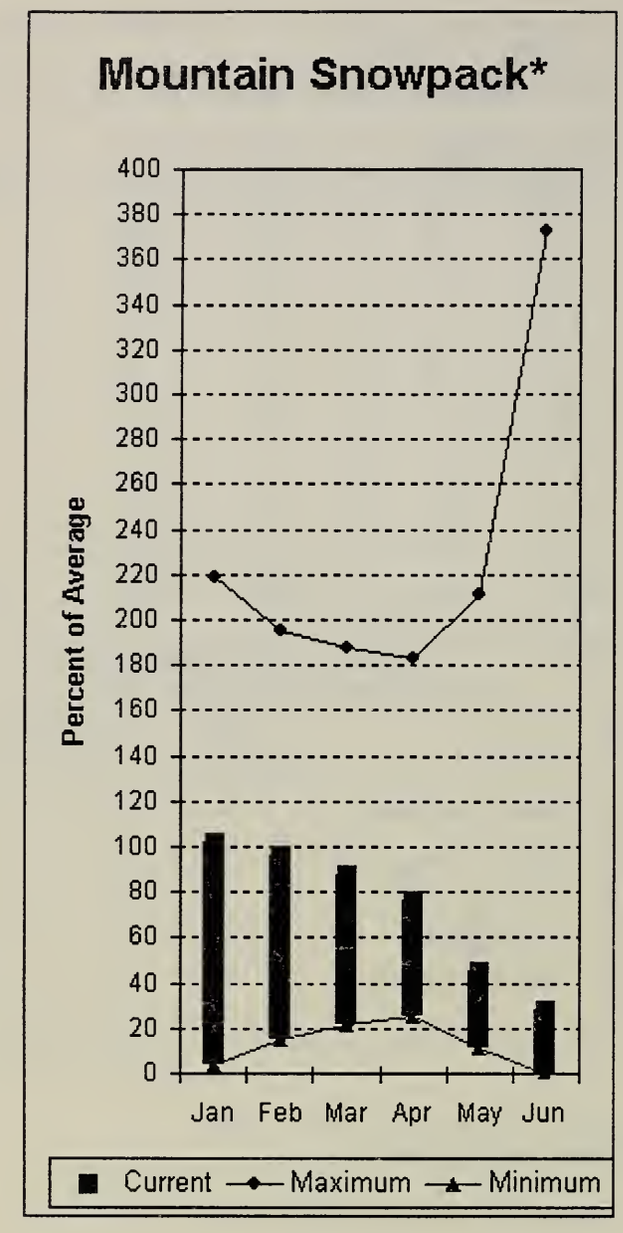
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
CHELAN LAKE BASIN	4	35	28
ENTIAT RIVER	1	0	0
WENATCHEE RIVER	6	23	18
STEMILT CREEK	1	0	0
COLOCKUM CREEK	1	0	0

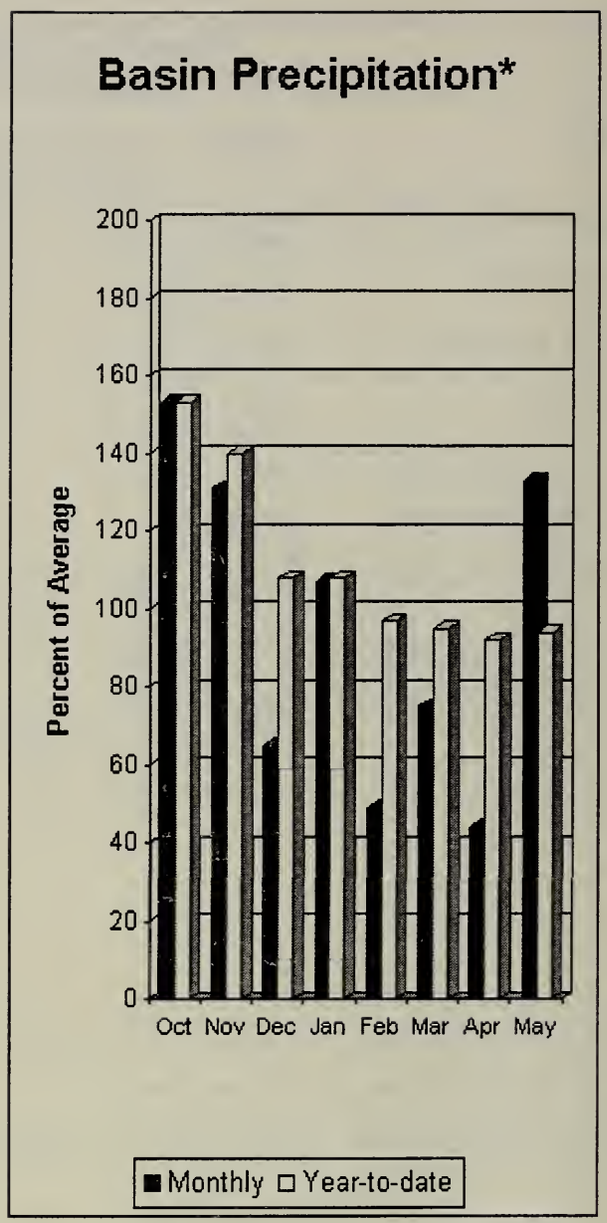
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Upper Yakima River Basin





*Based on selected stations

June 1 reservoir storage for the Upper Yakima reservoirs was 688,000-acre feet, 95% of average. Forecasts for the Yakima River at Cle Elum are 51% of average and the Teanaway River near Cle Elum is at 39%. Lake inflows are all forecasted to be in the 45% - 50% range this summer. May streamflows within the basin were Yakima near Cle Elum at 73% and Cle Elum River near Roslyn at 83%. June 1 snowpack was 28% based upon 6 SNOTEL readings within the Upper Yakima Basin. Precipitation was 133% of average for May and 94% year-to-date. Temperatures were 1-2 degrees below normal for the past 28 days and near average for the water year. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
KEECHELUS LAKE INFLOW	JUN-JUL	12.0	15.8	18.3	39	25	34	47
	JUN-SEP	18.9	24	27	46	34	45	59
KACHESS LAKE INFLOW	JUN-JUL	12.2	15.1	17.1	40	22	29	43
	JUN-SEP	16.5	20	23	45	29	37	51
CLE ELUM LAKE INFLOW	JUN-JUL	70	82	90	47	107	131	192
	JUN-SEP	90	105	115	50	135	166	230
YAKIMA at Cle Elum	JUN-JUL	124	149	166	49	201	251	340
	JUN-SEP	164	194	215	51	255	315	420
TEANAWAY near Cle Elum	JUN-JUL	7.5	11.1	13.5	37	20	31	37
	JUN-SEP	9.0	12.8	15.4	39	22	32	40

UPPER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
KEECHELUS	157.8	133.7	86.6	140.5
KACHESS	239.0	158.1	227.9	207.6
CLE ELUM	436.9	396.2	419.2	379.3

UPPER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2004

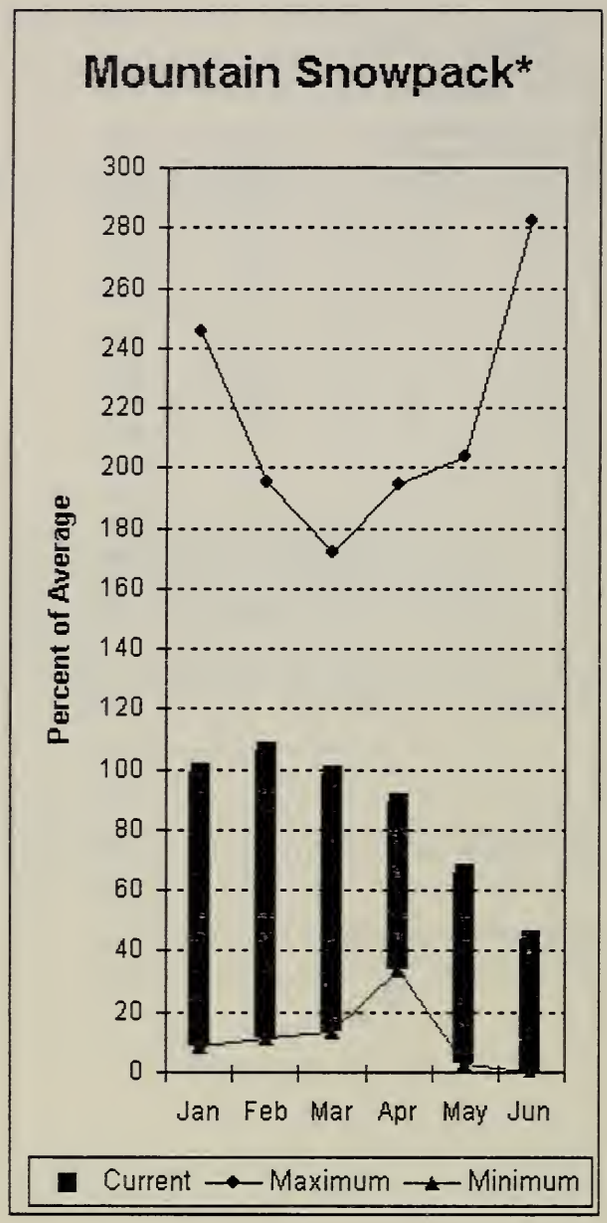
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
UPPER YAKIMA RIVER	6	57	28

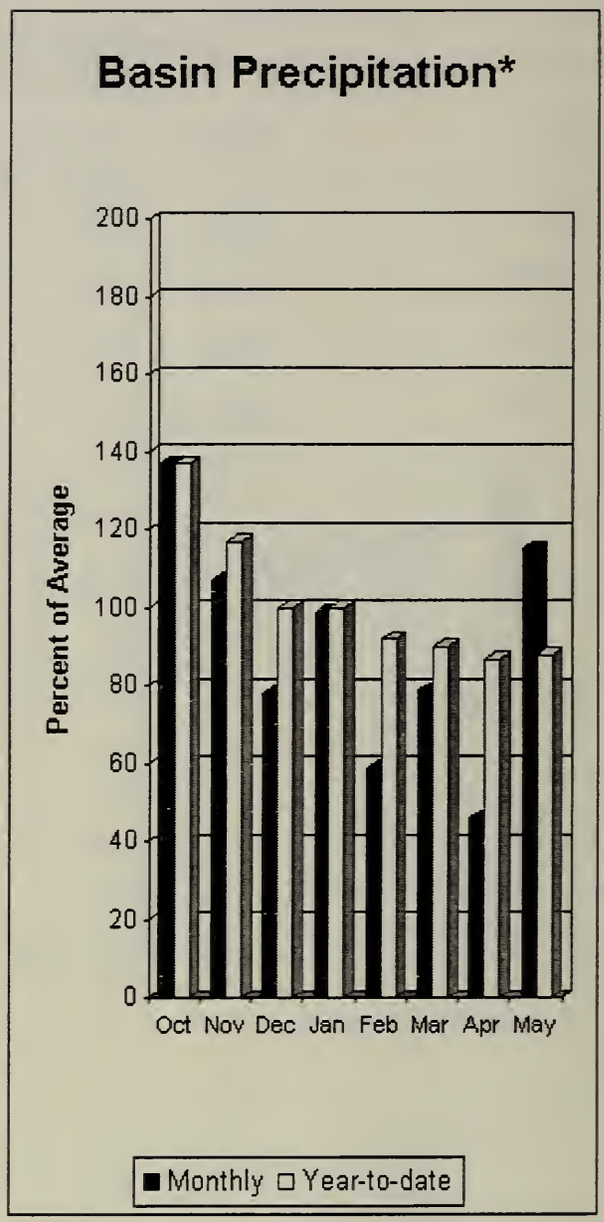
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under tne 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Lower Yakima River Basin





*Based on selected stations

May average streamflows within the basin were: Yakima River near Parker, 77%; Naches River near Naches, 87%; and Yakima River at Kiona, 42%. June 1 reservoir storage for Bumping and Rimrock reservoirs was 229,200-acre feet, 112% of average. Forecast averages for Yakima River near Parker are 48%; American River near Nile, 57%; Ahtanum Creek, 77%; and Klickitat River near Glenwood, 80%. June 1 snowpack was 44% based upon 5 SNOTEL readings within the Lower Yakima Basin. Precipitation was 115% of average for May and 88% year-to-date for water. Temperatures were 1-2 degrees below normal for the past 28 days and near average for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
BUMPING LAKE INFLOW	JUN-SEP	25	32	36	50	45	58	72
	JUN-JUL	20	26	30	49	38	50	61
AMERICAN RIVER near Nile	JUN-SEP	24	31	36	57	41	48	63
	JUN-JUL	16.0	23	28	52	33	40	54
RIMROCK LAKE INFLOW	JUN-SEP	66	80	90	63	100	114	144
	JUN-JUL	47	54	58	55	66	77	105
NACHES near Naches	JUN-SEP	161	190	210	51	250	305	410
	JUN-JUL	128	151	167	51	197	247	330
AHTANUM CREEK nr Tampico (2)	MAY-SEP	18.0	24	27	77	30	36	35
	MAY-JUL	15.0	20	23	74	26	31	31
YAKIMA near Parker	JUN-SEP	317	384	430	48	525	665	900
	JUN-JUL	243	298	335	47	415	530	715
KLICKITAT near Glenwood	JUN-JUN	25	31	35	80	39	45	44
	JUN-SEP	45	55	62	80	69	79	78

LOWER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
BUMPING LAKE	33.7	34.2	34.4	30.4
RIMROCK	198.0	195.0	198.0	173.5

LOWER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2004

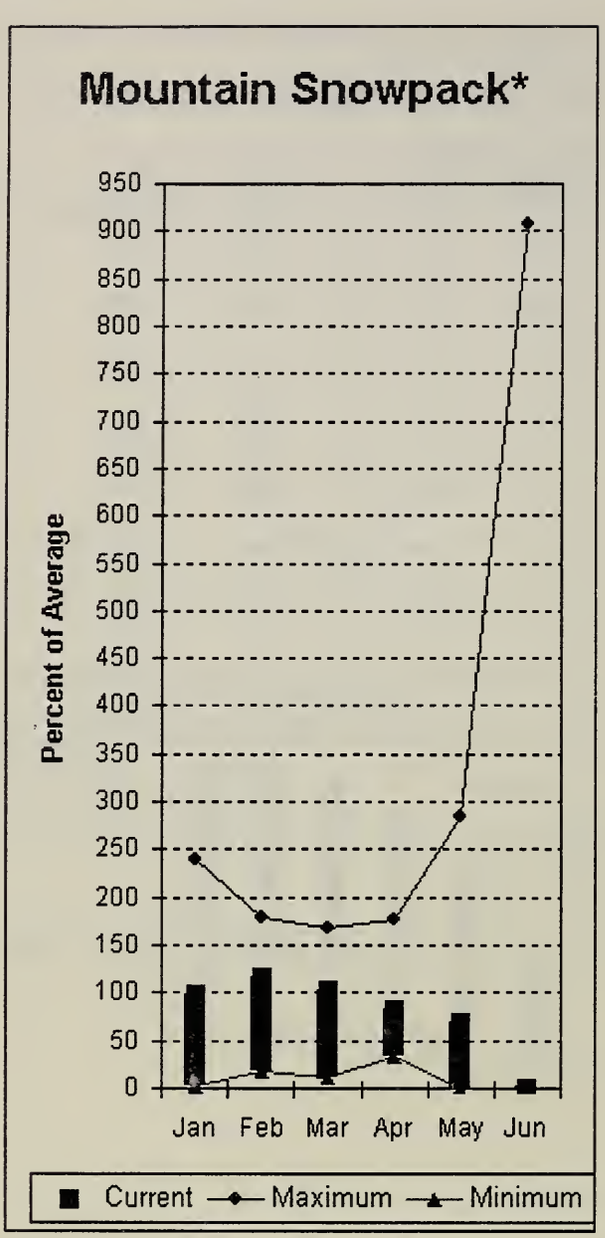
Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
Lower Yakima River	5	45	44
Ahtanum Creek	2	0	0

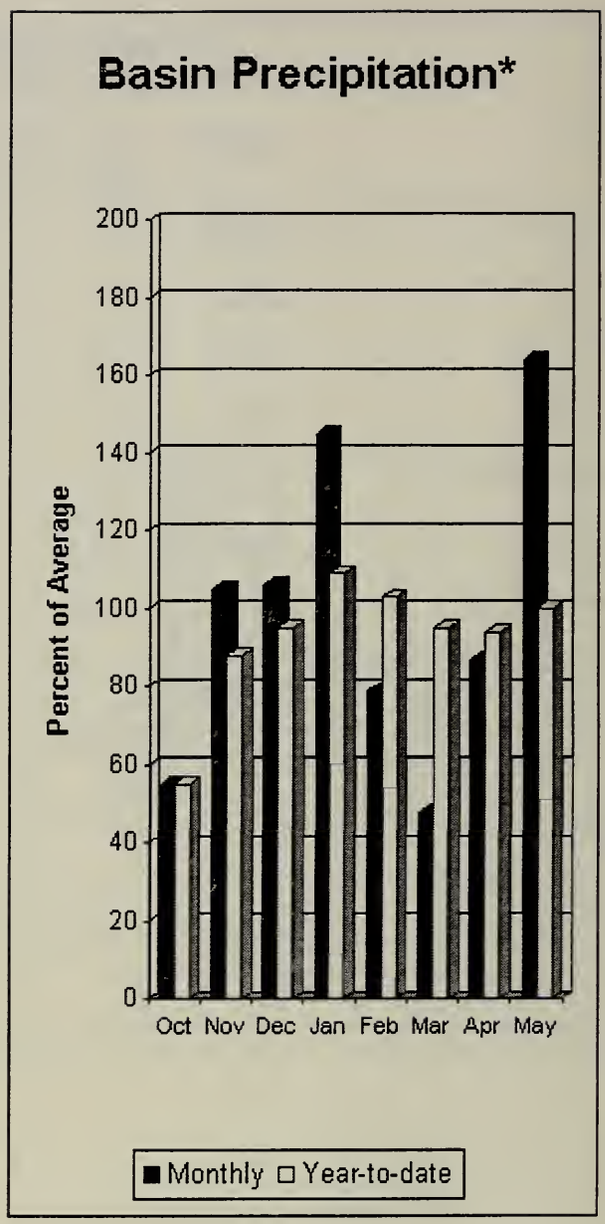
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Walla Walla River Basin





*Based on selected stations

May precipitation was 164% of average, maintaining the year-to-date precipitation at 100% of average. Snowpack in the basin melted out prior to June 1. Streamflow forecasts are 132% of average for Mill Creek for the May-September period. Most of which ran off during the large precipitation events the occurred last month. SF Walla Walla near Milton-Freewater is forecasted to receive 109% average flows for the June-September period. May streamflow was 186% of average for the Walla Walla River. Average temperatures were 2 degrees below normal for the past 28 days and 1-2 degrees above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
MILL CREEK at Walla Walla	MAY-SEP	8.70	10.60	11.90	132	13.20	15.10	9.00
	MAY-JUL	8.60	10.50	11.80	133	13.10	15.00	8.90
SF WALLA WALLA near Milton-Freewater	JUN-JUL	17.3	20	22	115	24	27	19.2
	JUN-SEP	30	33	36	109	39	42	33

WALLA WALLA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

WALLA WALLA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2004

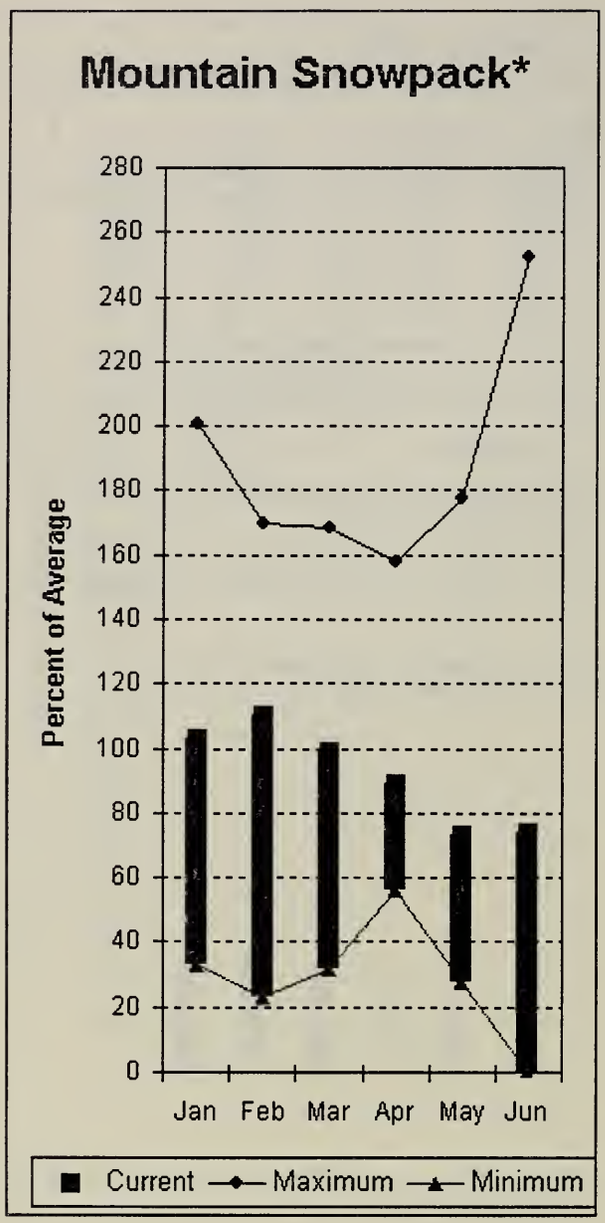
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WALLA WALLA RIVER	2	0	0

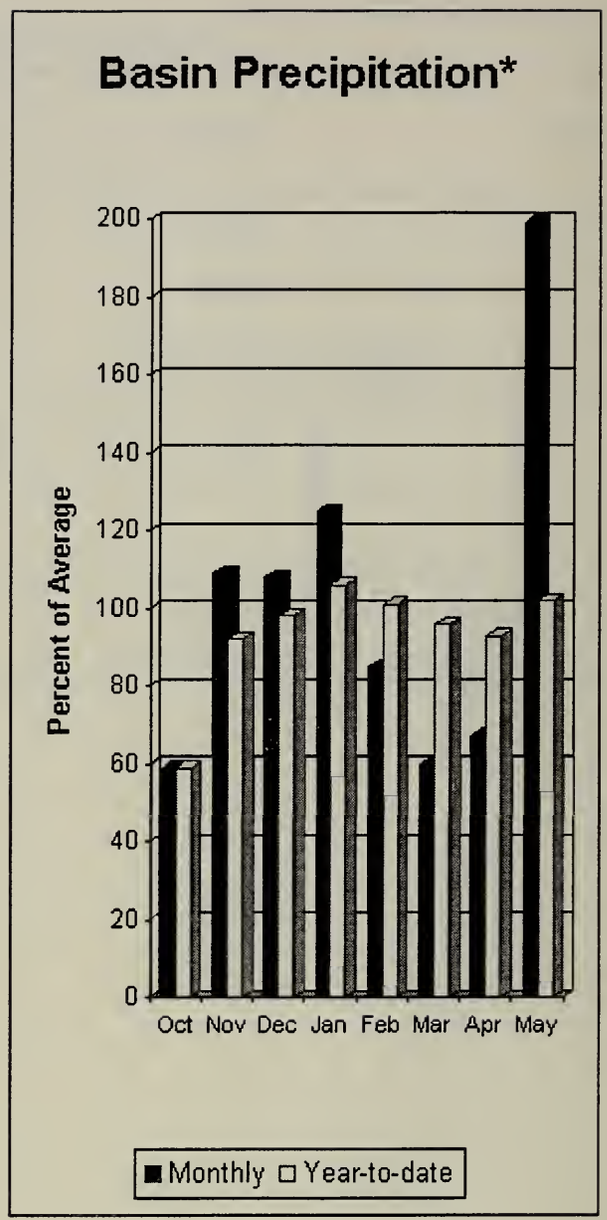
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Lower Snake River Basin





*Based on selected stations

The June - September forecast is for 65% for Clearwater River at Spalding. The Snake and Grande Ronde rivers can expect summer flows to be about 68% and 73% of normal respectively. May precipitation was 199% of average, bringing the year-to-date precipitation to 102% of average. June 1 snowpack readings averaged 74% of normal. May streamflow was 76% of average for Snake River below Lower Granite Dam and 91% for Grande Ronde River near Troy. Average temperatures were 1 degree below normal for the past 28 days and 2 degrees above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
GRANDE RONDE at Troy (1)	JUN-JUL	209	299	340	72	381	470	470
	JUN-SEP	253	361	410	73	459	567	565
CLEARWATER at Spalding (1,2)	JUN-JUL	1311	1650	1880	64	2240	3030	2960
	JUN-SEP	1556	1927	2180	65	2570	3420	3370
SNAKE blw Lower Granite Dam (1,2)	JUN-JUL	4653	5765	6270	67	6775	7890	9340
	JUN-SEP	6067	7479	8120	68	8760	10170	11900

LOWER SNAKE RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

LOWER SNAKE RIVER BASIN
Watershed Snowpack Analysis - June 1, 2004

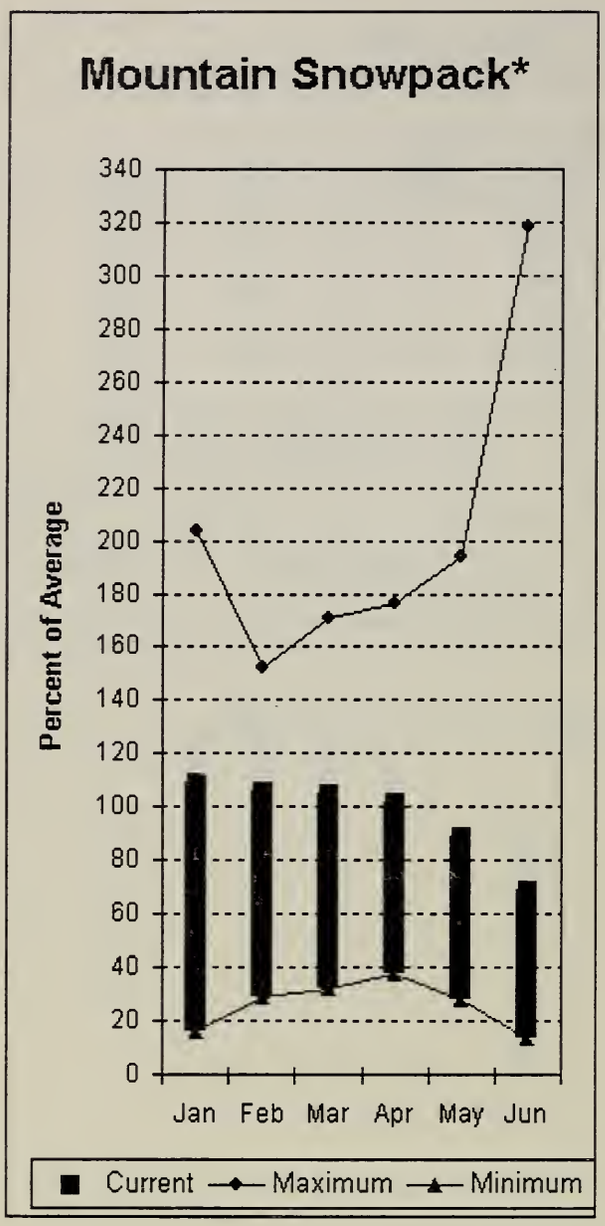
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LOWER SNAKE, GRANDE RONDE	9	81	74

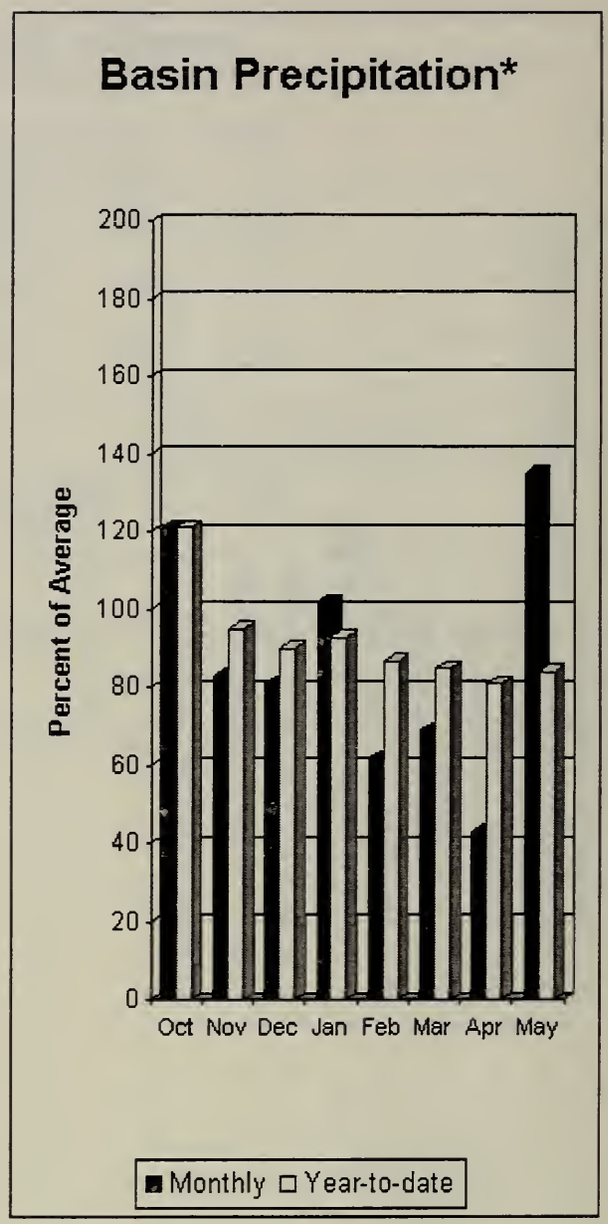
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Cowlitz - Lewis River Basins





*Based on selected stations

Forecasts for June – September streamflows within the basin are Lewis River at Ariel, 87% and Cowlitz River at Castle Rock, 76% of average. The Columbia River at The Dalles is forecasted to have 77%of average flows this summer. May average streamflow for Cowlitz River was 82% and 61% for Lewis River. The Columbia River at The Dalles was at 78% of average. May precipitation was 135% of average and the water-year average was 84%. June 1 snow cover for Cowlitz River was 75%, and Lewis River was 63% of average. Average temperatures were 2 degrees above normal during the past 28 days and 2 degrees above normal throughout the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
LEWIS at Ariel (2)	JUN-JUL	219	261	290	86	319	361	338
	JUN-SEP	334	385	420	87	455	506	483
COWLITZ R. bl Mayfield Dam (2)	JUN-SEP	66	439	755	81	1071	1535	938
COWLITZ R. at Castle Rock (2)	JUN-SEP	50	557	960	76	1363	1957	1259
KLICKITAT near Glenwood	JUN-JUN	25	31	35	80	39	45	44
	JUN-SEP	45	55	62	80	69	79	78
COLUMBIA R. at The Dalles (2)	JUN-SEP	32745	39566	44200	77	48830	55650	57800
	JUN-JUL	23544	29234	33100	76	36970	42660	43800

COWLITZ - LEWIS RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

COWLITZ - LEWIS RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

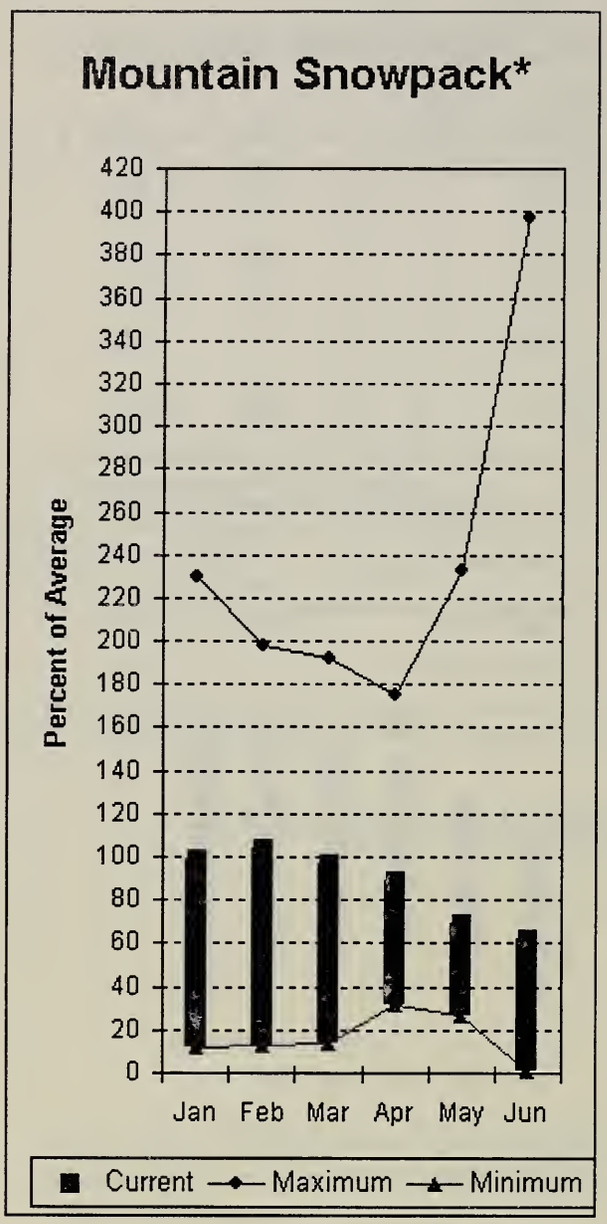
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LEWIS RIVER	4	97	63
COWLITZ RIVER	5	99	75

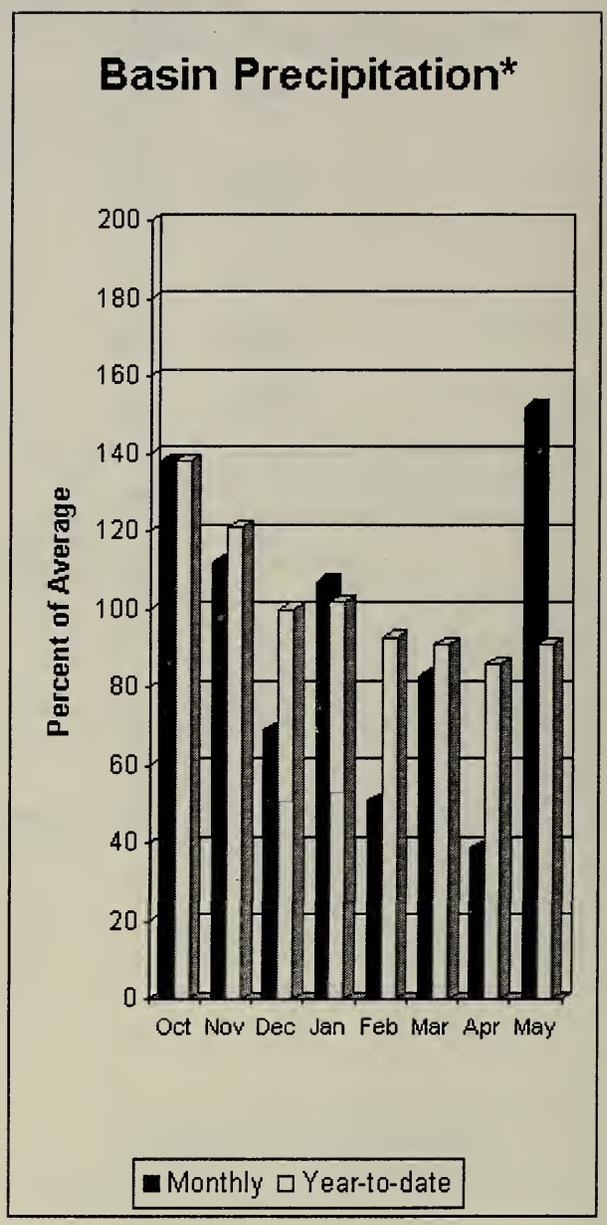
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

White - Green River Basins





*Based on selected stations

Summer runoff is forecast to be 88% of normal for the Green River below Howard Hanson Dam and 88% for the White River near Buckley. June 1 snowpack was 62% of average in both the White River and the Puyallup River basins and the Green River Basin had mostly melted out. Water content on June 1 at Corral Pass SNOTEL, at an elevation of 6,000 feet, was 20.3 inches. This site has a June 1 average of 23.1 inches. May precipitation was 152% of average, bringing the water year-to-date to 91% of average for the basins. Average temperatures in the area were 1-2 degrees above normal for the past 28 days and 1-2 degrees above normal for the water-year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
WHITE near Buckley (1,2)	JUN-JUL	141	175	190	86	205	239	220
	JUN-SEP	212	255	275	88	295	338	313
GREEN below Howard Hanson (1,2)	JUN-JUL	36	56	65	89	74	94	73
	JUN-SEP	54	77	87	88	98	121	99

WHITE - GREEN - PUYALLUP RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

WHITE - GREEN - PUYALLUP RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

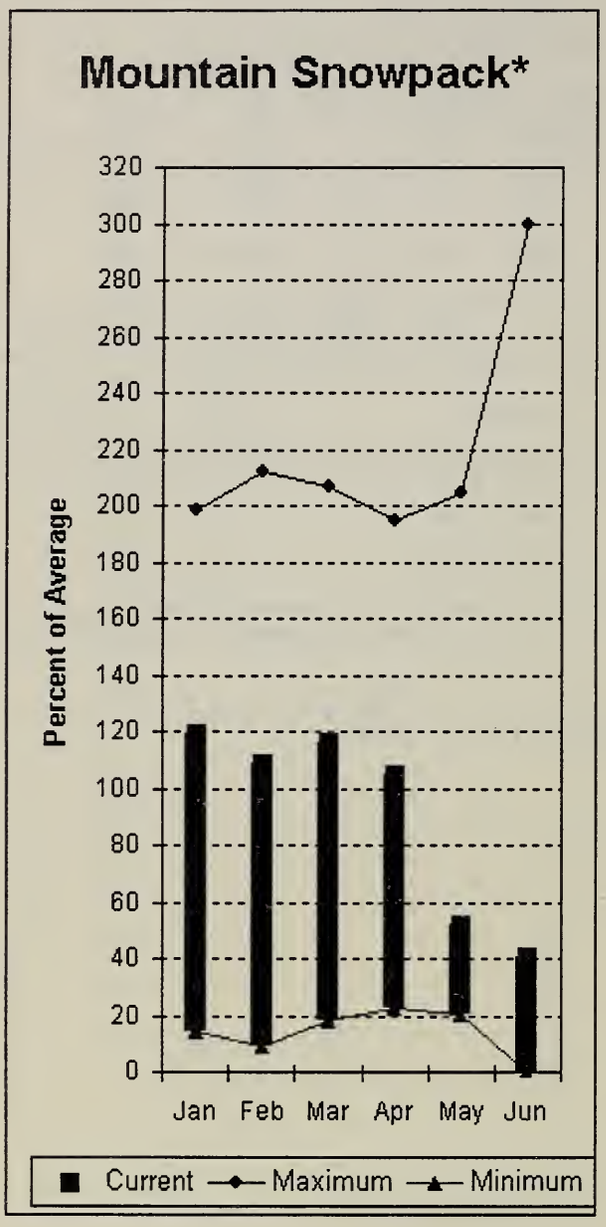
Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
WHITE RIVER	2	52	62
GREEN RIVER	1	0	0
PUYALLUP RIVER	2	52	62

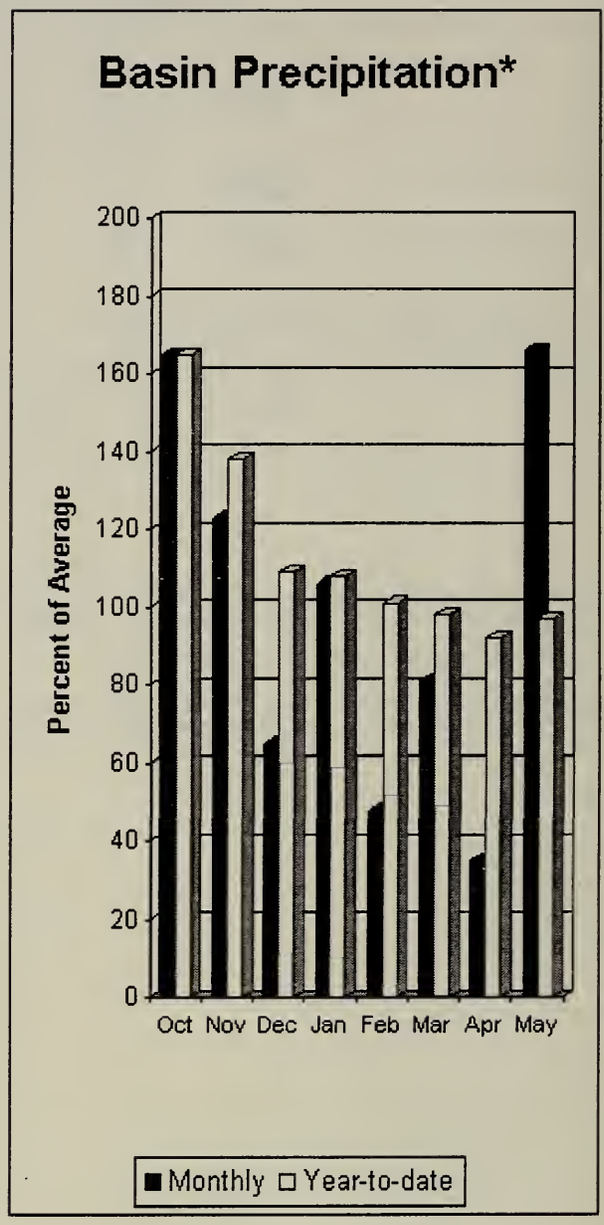
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Central Puget Sound River Basins





*Based on selected stations

Forecast for spring and summer flows are: 79% for Cedar River near Cedar Falls; 79% for Rex River; 88% for South Fork of the Tolt River; and 80% for Cedar River at Cedar Falls. Basin-wide precipitation for May was 166% of average, bringing water-year-to-date to 97% of average. June 1 snow cover in Tolt River Basin was 46%, Snoqualmie River Basin was 39%, and Skykomish River Basin was 37%. The Cedar River Basin had melted out prior to June 1. Alpine Meadows SNOTEL site, at 3500 feet, had 15 inches of water content. Average June 1 water content is 31.4 inches at Alpine Meadows. Temperatures were 1-2 degrees above average for the past 28 days and 1 degree above normal for the water-year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
CEDAR near Cedar Falls	JUN-JUL	10.2	16.6	21	78	25	32	27
	JUN-SEP	13.8	22	27	79	32	40	34
REX near Cedar Falls	JUN-JUL	1.42	4.33	6.30	77	8.27	11.18	8.20
	JUN-SEP	2.5	6.1	8.5	79	10.9	14.5	10.8
CEDAR RIVER at Cedar Falls	JUN-JUL	6.7	11.4	14.6	80	17.8	23	18.2
	JUN-SEP	9.1	12.0	14.0	80	16.0	18.9	17.5
SOUTH FORK TOLT near Index	JUN-JUL	3.41	4.42	5.10	84	5.78	6.79	6.10
	JUN-SEP	5.49	6.57	7.30	88	8.03	9.11	8.30

CENTRAL PUGET SOUND RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

CENTRAL PUGET SOUND RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

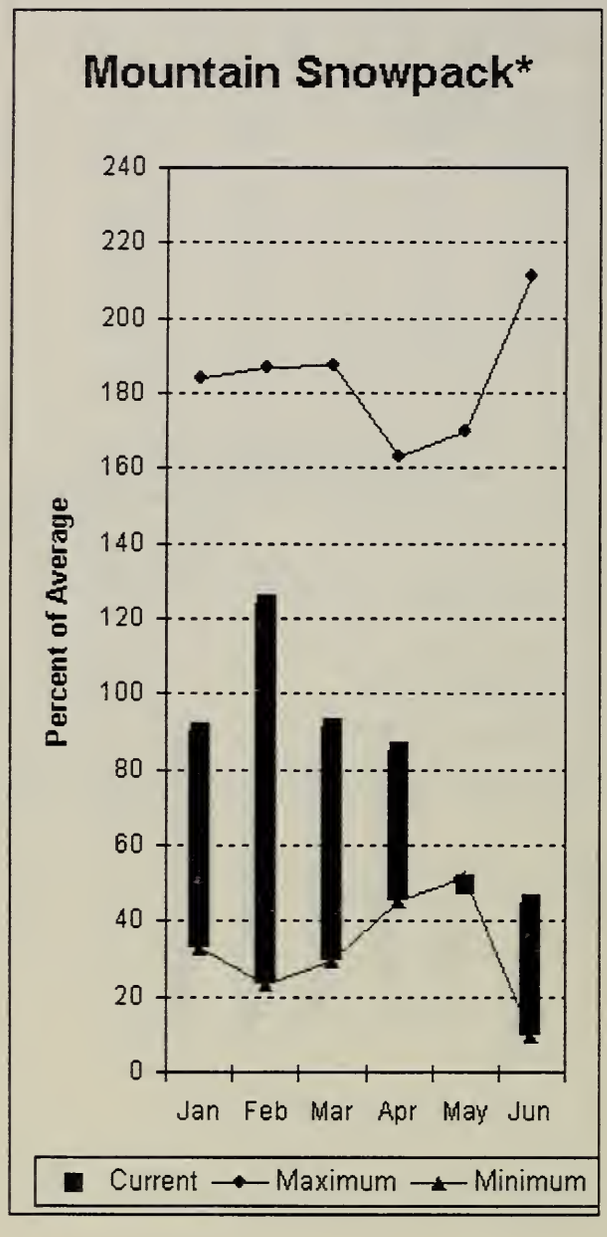
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
CEDAR RIVER	4	0	0
TOLT RIVER	2	117	46
SNOQUALMIE RIVER	4	74	39
SKYKOMISH RIVER	2	93	37

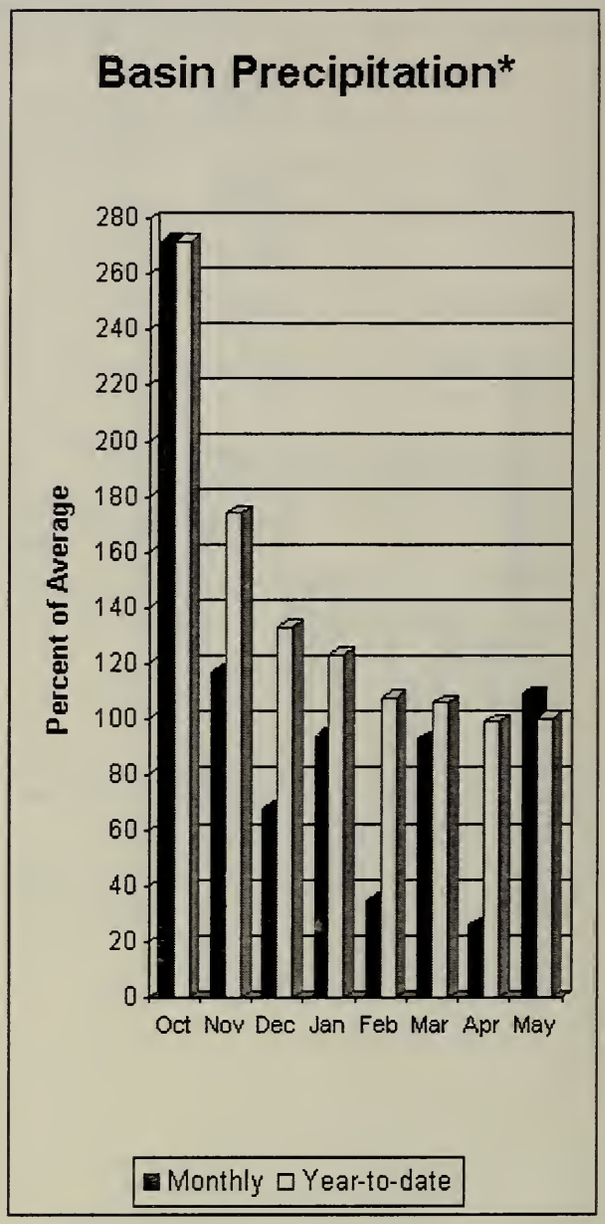
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

North Puget Sound River Basins





*Based on selected stations

Forecast for Skagit River streamflow at Newhalem is 73% of average for the spring and summer period. May streamflow in Skagit River was 90% of average. Other forecast points included Baker River at 76% and Thunder Creek at 84% of average. Basin-wide precipitation for May was 109% of average, bringing water-year-to-date to 100% of average. June 1 average snow cover in Skagit River Basin was 34%, Baker River Basin was at 55% and Nooksack River Basin had melted out. Rainy Pass SNOTEL, at 4,780 feet, had 5 inches of water content. Average June 1 water content is 24.3 inches at Rainy Pass. June 1 Skagit River reservoir storage was 118% of average and 89% of capacity. Average temperatures for the past 28 days were 1 degree above normal for the basin and 1 degree above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<-- Drier (90% (1000AF))	Drier (70% (1000AF))	Future Conditions: 50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	Wetter (30% (1000AF))	Wetter (10% (1000AF))	30-Yr Avg. (1000AF)
THUNDER CREEK near Newhalem	JUN-JUL	108	121	130	82	139	152	158
	JUN-SEP	186	203	215	84	227	244	257
SKAGIT at Newhalem (2)	JUN-JUL	577	671	735	70	799	893	1054
	JUN-SEP	848	954	1025	73	1096	1202	1407
BAKER RIVER near Concrete	JUN-JUL	283	311	330	71	349	377	465
	JUN-SEP	493	509	520	76	531	547	687

NORTH PUGET SOUND RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROSS	1404.1	1240.6	1188.8	1031.4
DIABLO RESERVOIR	90.6	84.4	---	86.9
GORGE RESERVOIR	9.8	7.9	---	8.2

NORTH PUGET SOUND RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

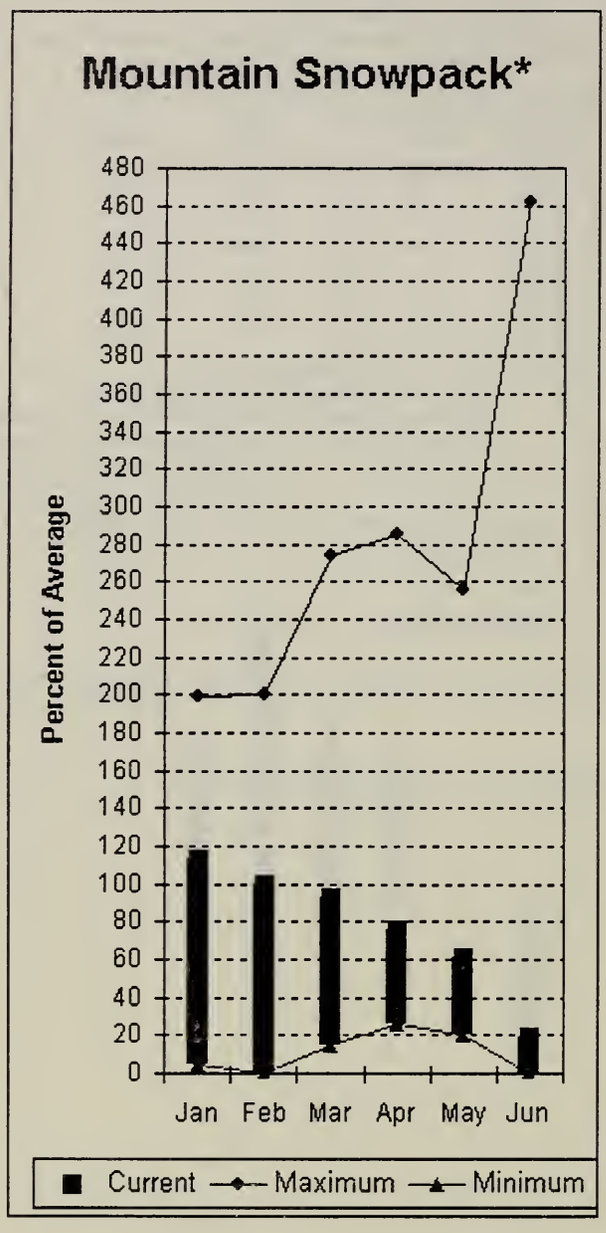
Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
SKAGIT RIVER	3	45	19
BAKER RIVER	0	68	0
NOOKSACK RIVER	1	0	0

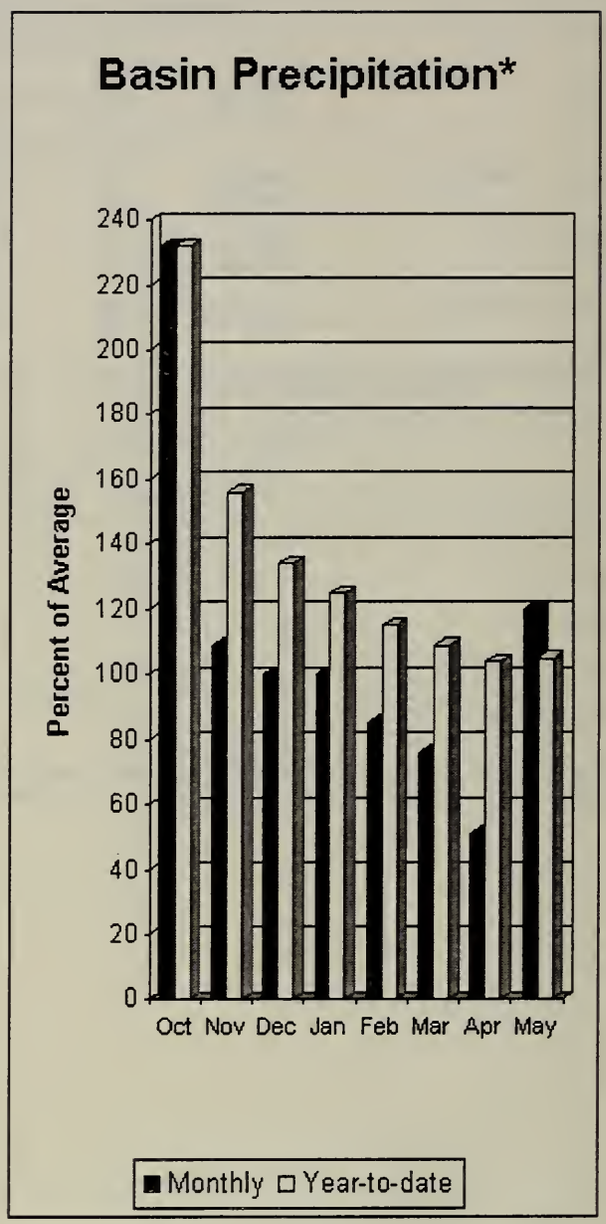
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Olympic Peninsula River Basins





*Based on selected stations

Forecasted average runoff for streamflow in the Dungeness River and Elwha River basins is 83% and 72% respectively. Big Quilcene and Wynoochee rivers should expect runoff in that same range this summer also. May precipitation was 120% of average. Precipitation has accumulated at 105% of average for the water year. May precipitation at Quillayute was 4.25 inches. The thirty-year average for May is 5.51 inches. Olympic Peninsula snowpack averaged 19% of normal on June 1. Temperatures were 1-2 degrees above average for the past 28 days and 1-2 degrees above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2004

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
DUNGENESS near Sequim	JUN-SEP	70	77	82	83	87	94	99
	JUN-JUL	51	56	59	83	62	67	71
ELWHA near Port Angeles	JUN-SEP	185	206	220	72	234	255	306
	JUN-JUL	131	147	158	71	169	185	222

OLYMPIC PENINSULA RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

OLYMPIC PENINSULA RIVER BASINS
Watershed Snowpack Analysis - June 1, 2004

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
OLYMPIC PENINSULA	1	45	19

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

GLACIER PAGE 2004

North Cascades National Park Glacier Monitoring Program

The National Park Service began monitoring glaciers in North Cascades National Park in 1993 and Mount Rainier glaciers in 2002 (see the Mount Rainier Glacier Page). Goals for this program and additional data can be found at North Cascades National Park home page at http:/www.nps.gov/noca/massbalance.htm or contact Jon_Riedel@nps.gov or Rob_Burrows@nps.gov.

The four glaciers monitored are located at the headwaters of four watersheds, each with large hydroelectric operations (Figure 1). The glaciers represent a range in elevation from 8800 to 5600 feet, and a range in climatic conditions from maritime to continental. Methods include three visits annually to each glacier to measure winter accumulation and summer melt. Measurements are taken at a series of points down the centerline of each glacier (Table 1), then integrated across the entire glacier surface to determine mass balance for the entire glacier. Glaciers east of the hydrologic crest of the park (Silver and Sandalee) have recently had more positive mass balances than the west-side glaciers (Noisy, North Klawatti, South Cascade) due to their higher elevations, and north aspects (Figure 2). In addition to the accumulation and ablation measurements each glacier was remapped in 2002 to quantify terminus and surface elevation changes. A 10-year data summary will be published this year.

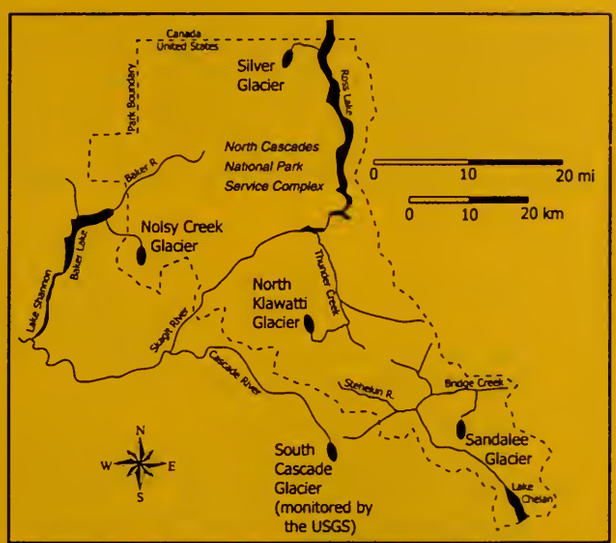


Figure 1. Glaciers monitored in North Cascades N.P.S. Complex.

Table 1. Glacier:	Elevation (feet)	Average Accumulation (inches W.E.)	2004 Accumulation (inches W.E.)	2004 Percent of Average
Noisy Creek Density= 0.49 @ 5900 ft 4/26/04	**Entire Glacier**	**124**	**104**	**84**
	6061	130	105	81
	6038	133	114	85
	5900	121	84	72
	5760	115	106	92
	5630	114	99	87
Silver Density= 0.43 @ 8550 ft 4/30/04	**Entire Glacier**	**95**	**78**	**83**
	8550	117	98	84
	8050	102	74	73
	7544	118	79	67
	7050	63	65	103
N.Klawatti Density= 0.44@7665' 0.46@6080' 4/22/04	**Entire Glacier**	**118**	**84**	**71**
	7665	122	89	73
	7300	124	90	73
	6900	124	85	69
	6390	106	81	76
	6080	98	83	85
Sandalee Density= 0.48@7360' 0.41@6780' 4/22/04	**Entire Glacier**	**121**	**84**	**69**
	7360	114	89	78
	7157	127	87	69
	6900	114	77	75
	6780	131	80	61

Table 1 presents this spring's provisional winter accumulation data, along with average values and percent of the 12-year average. The 2004 snow depths were measured between April 21 and 30 on the four glaciers. Ice layers and cold temperatures within the snowpack made probing difficult on the upper Silver Glacier. These data are tentative and will be revised after a July visit. We measured snow densities at the top and bottom of Sandalee and N. Klawatti glaciers, at the top of Silver Glacier, and at the midpoint of Noisy Glacier. Densities are in fraction of water density.

Estimates of glacial contribution to runoff for three watersheds are based on the mass balance measurements and GIS analyses to determine glacier area within 165 ft elevation bands (Table 2). Glaciers reduce the variation of flow in these watersheds by providing meltwater during summer drought from ice in dry/warm years, and by storing water in excess snowpack during wet/cool years. Glacial contribution to stream flow in these watersheds varies by as much as 100% annually. Magnitude of glacial contribution to streamflow is large, but varies by the amount of glacial cover in each watershed. Thunder Creek is 13% glacierized, while Baker River and Stehekin River are 6% and 3% glacierized, respectively (Post and others, 1971; Granshaw, 2002).

Relative importance of glacial contribution to streamflow increases from west to east. For example, glaciers annually contribute a higher percentage of meltwater to streamflow in the Stehekin watershed than in the Baker, despite the fact that the Baker is more glaciated. This is due to lower snowfall east of the hydrologic crest of the North Cascades. In this below average accumulation year we anticipate that glacier contribution to summer runoff will be above average, particularly because of below average snowpack at elevations below the glaciers.

	Mean Glacial Runoff (1000s acre-feet)	Range of Glacial Runoff (1000s acre-feet)		Percent Glacial Runoff to Total Summer Runoff	
		Minimum	Maximum	Minimum	Maximum
Noisy Creek Glacier	1.4	1.1	1.9	---	---
Baker River Watershed	68	50	87	6	15
North Klawatti Glacier	4.0	2.8	4.8	---	---
Thunder Creek Watershed	103	78	132	23	44
Sandalee Glacier	0.5	0.4	0.6	---	---
Stehekin River Watershed	74	52	134	5	19
Silver Glacier	0.9	0.7	1.0	---	---
Ross Lake Watershed	63	47	81	N/A	N/A

Table 2. Glacial contribution to summer stream flow (May 1 to Sept. 30) for three watersheds. Runoff units are thousands of acre-feet. Data from 1993-2003 except the Sandalee Glacier and Stehekin River Watershed (1995-2003).

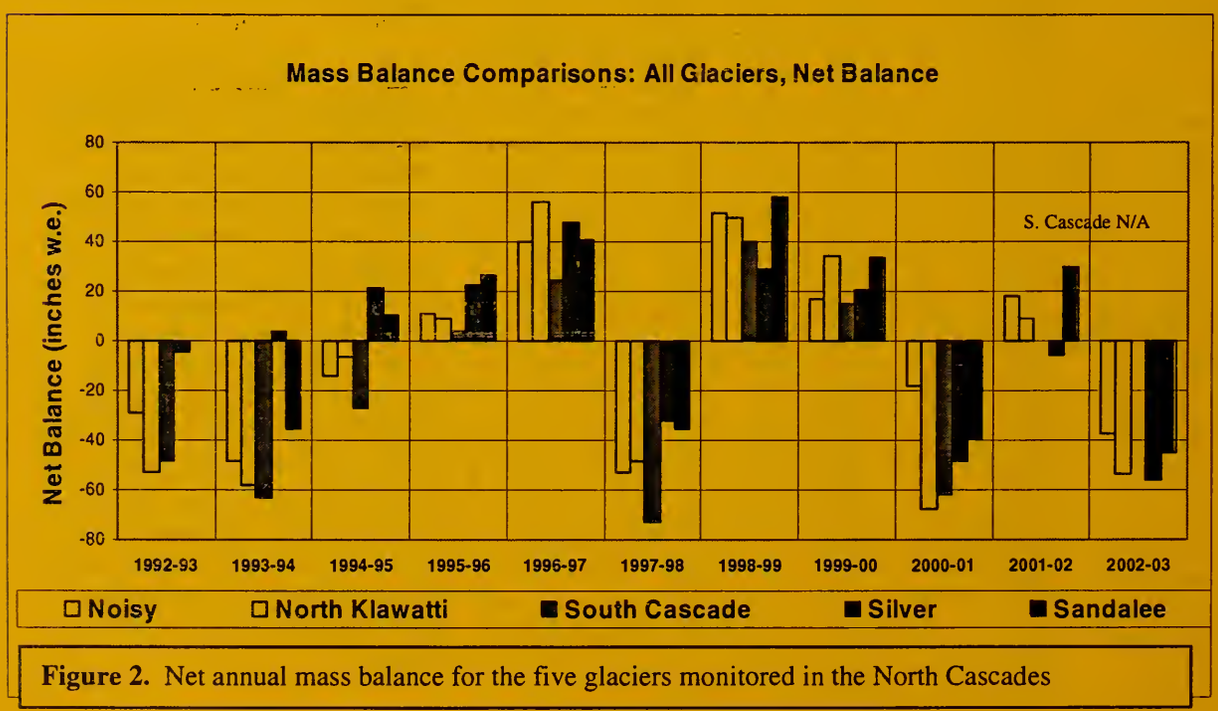


Figure 2. Net annual mass balance for the five glaciers monitored in the North Cascades

MOUNT RAINIER GLACIER PAGE 2004

This year the National Park Service continues to collect snow depth and ablation data for monitoring mass balance annually on Mount Rainier glaciers. This program is a cooperative venture between Mount Rainier National Park, the US Geological Survey, and North Cascades National Park. The program includes field measurements on Nisqually Glacier and Emmons Glacier, annual air photography, and 10-year remapping of the glaciers below 10,000 feet.

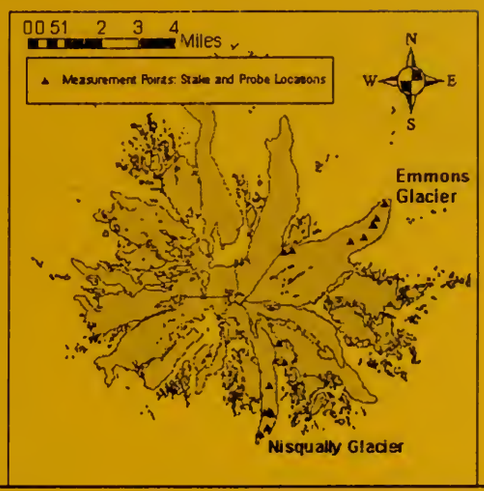


Figure 1. Glacier cover of Mount Rainier, monitored glaciers, and measurement locations on Muir Snowfield, Emmons, and Nisqually Glaciers

Between March 30 and May 2 we measured bulk density of the snowpack, probed snow depths, and placed ablation stakes on the Nisqually and Emmons glaciers below 10,000 feet. Accumulation on the south side of the mountain (Muir Snowfield and Nisqually Glacier) may show an increasing trend with elevation to ~7200 feet and decreasing trend above (Table 1). However, the snow depth measurement at 7200 feet is based on one measurement that could be an overestimate. Depth measurements in June will help clarify this uncertainty. Accumulation on Emmons Glacier generally increases with altitude to the ceiling of our spring measurements at ~9500 feet (Table 1). Nearby SNOTEL sites (Morse Lake, Corral Pass, and Paradise) indicate glacier measurements were taken near the time of maximum snowpack at these sites. Ablation stakes were placed at 7200, 6200, and 5500 feet on Nisqually Glacier, at 9840 and 8640 feet on the Muir Snowfield, and at 9470, 7300, 6460, and 5570 feet on Emmons Glacier. We will return in mid June to check ablation stakes, probe snow depths, and place additional stakes in debris covered ice on the lowermost part of each glacier. In addition we will probe snow depth above 10,000 feet on the mountain. On a fall visit (late September/early October) we will record final ablation measurements from the stakes. For more information contact Jon_Riedel @nps.gov or Rob_Burrows@nps.gov.

Table 1	Elevation feet	Accumulation (inches w.e.) 2003	2004
Emmons Glacier	9470	56	90
	9200	na	102
	7300	134	64
	6460	65	63
	5575	58	47
	5590	na	35
	5050	22	29
Muir Snowfield and Nisqually Glacier	9840	71	87
	8640	na	92
	7180	125	154*
	6200	106	99
	6150	100	84
	5500	48	67
	5280	68	74
	5120**	61	72

*one measurement near crevasse depression, probably overestimate
** Paradise SNOTEL site.

Table 1. Accumulation on Mount Rainier Glaciers, Spring 2003 and 2004. Determined from probing snow depth at 1 to 11 points on each elevation contour. Provisional Data.

Table 2. 2004 spring snow density measured on Mt. Rainier. Although the density was measured a month apart on the upper and lower Emmons Glacier we believe this represents the density at near maximum snow accumulation at each point. Provisional Data.

Glacier	Snow Density	Altitude (feet)	Snow Depth (inches)	Date
Emmons	0.43	9470	219	5/2/04
Emmons	0.38	7300	118	3/31/04
Emmons	0.40	6460	152	3/30/04
Emmons	0.43	5575	93	3/30/04
Emmons	0.47	5575	77	5/2/04
Muir Snowfield	0.41	9800	198	4/9/04
Nisqually	0.53	6820	271	4/8/04
Nisqually	0.47	5700	155	4/8/04
Paradise SNOTEL	0.50	5120	146	4/8/04

Mount Rainier Glacier Monitoring 2003 Summary

The 2003 season of glacier monitoring on Mount Rainier was extremely productive and provided interesting results and new insights about Emmons and Nisqually Glaciers. Eight visits each were made to the glaciers between April 1 and October 26 to assess the accumulation and ablation of snow, firn and ice at selected points. Accumulation was measured on lower Emmons Glacier on April 1 and near Camp Schurman, mid glacier, on May 1. Snow depth was measured above 10,000 feet on Emmons Glacier on June 18 along with snow density in the summit crater and at 9500 feet near Camp Schurman.

Ablation data versus altitude are fitted with a linear function from the stakes placed in May. This linear function is extrapolated to the upper mountain. Surface ablation losses based on this function are added to the average snow depth from June 18 at each location to find estimates for total winter snow depth. Winter balance (bw) is the product of snow density (also a linear relation with altitude) and total winter snow depth. These are cubic fits for both Nisqually and Emmons Glaciers. Because of the difficult access to upper Nisqually glacier no data were collected above 10,000 feet. Based on the near monotonic relationship of winter balance to altitude on the upper Emmons Glacier a similar relationship is assumed for the upper Nisqually (Figures 2 and 3).

Ablation magnitude and rates on lower Emmons Glacier separate out into two distinct zones; bare ice and debris covered ice (Figure 2). The debris is thick enough that it has a significant insulating effect thus reducing ablation by 38% compared to bare ice at the same altitude on the glacier. Debris on lower Emmons remains primarily from the huge 1963 rock avalanche, in addition to some medial and lateral moraine material. On lower Nisqually Glacier the debris cover seems to enhance melting except at the stake at 5820 feet (outlier in summer balance plot on Figure 3). A cubic function is fit to all the summer balance data up to 8850 feet and a linear above. Note that summer balance for Emmons Glacier (northeast aspect) reaches zero at 13,100 feet, while on Nisqually (south aspect) the zero value would occur above the top of the glacier. This is expected given the different amounts of solar radiation that the glaciers on the differing aspects of the mountain receive.

The end result of these seasonal measurements is an estimate of the health of each glacier. Table 1 shows glacier-wide winter (bw), summer (bs), and net (bn) balances for both glaciers. These values are the result of integrating the altitude-balance functions (or fits) discussed above and shown in Figures 2 and 3 with 10 meter altitude bands on each glacier. The 2003 Water Year was very negative for glaciers at Mt. Rainier and across the region. At Mount Rainier Emmons Glacier lost an average of 111 inches (almost 10 feet) of water across the surface and Nisqually lost an average of 94 inches (almost 8 feet) All data presented here are provisional.

Glacier	Balance (inches w.e.)		error	Measurement Date
Emmons	bw=	86	21	April 1 and May 1
	bs=	-197	33	October 14
	bn=	-111	39	----
Nisqually	bw=	67	15	April 21
	bs=	-183	30	October 25
	bn=	-94	33	----

Table 1. Provisional glacier-wide balances for Water Year 2003

Figure 2

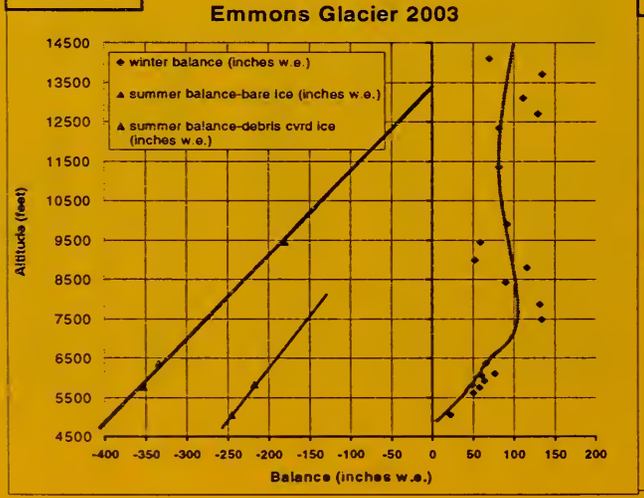
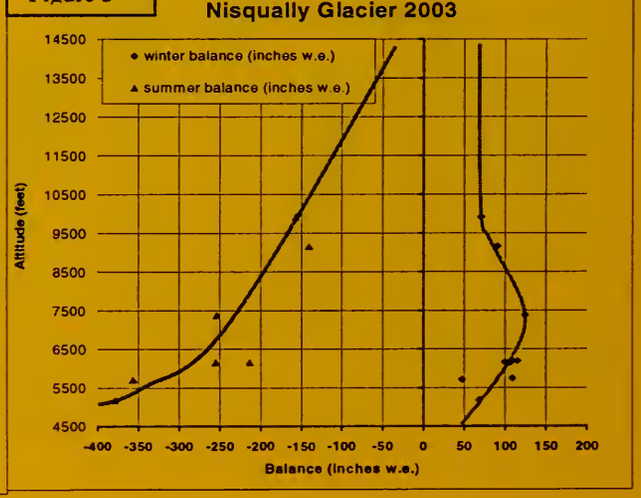


Figure 3



Issued by

Bruce Knight
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

R.L. "Gus" Hughbanks
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada

Ministry of Sustainable Resources
Snow Survey, River Forecast Centre, Victoria, British Columbia

State

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal

Department of the Army
- Corps of Engineers

U.S. Department of Agriculture
- Forest Service

U.S. Department of Commerce
- NOAA, National Weather Service

U.S. Department of Interior
- Bonneville Power Administration
- Bureau of Reclamation
- Geological Survey
- National Park Service
- Bureau of Indian Affairs

Local

City of Tacoma
City of Seattle
Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company
Snohomish County P.U.D.
Colville Confederated Tribes
Spokane County
Yakama Indian Nation
Whatcom County
Pierce County

Private

Okanogan Irrigation District
Wenatchee Heights Irrigation District
Newman Lake Homeowners Association
Whitestone Reclamation District

*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

NATIONAL AGRICULTURAL LIBRARY
1022660491

UNITED STATES POSTAGE
136
0501 $01.06 PB8706505
8132 MOUNT VERNON, WA JUN 09 04
98273

Washington Snow Survey Office
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873

FOR OFFICIAL USE ONLY

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICUL. LIBRARY
CURRENT SERIAL RECORDS
ROOM 002
BELTSVILLE, MD 20705-2351

Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA